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Control of Septic Sore Throat*

G. J. HUCKER, PH.D., F.A.P.H.A.
Chief in Research, New York State Agricultural Experiment Station, Geneva, N. Y.

THE control of streptococcic infections is a significant part of the duties of any health officer. There are no authentic records as to the number of cases of infections traceable directly or indirectly to streptococci; however, from reports available from the U. S. Treasury Department, it may be noted that since 1925 there have been more than 2,000,000 cases of scarlet fever in the United States and more than 53,000 reported cases of septic sore throat. These two types of infections, both reportable in most states, give some indication of the importance of these streptococcus infections from a public health viewpoint.

The control of scarlet fever and septic sore throat has constituted a serious problem, particularly in certain sections of the country. The available figures on these two diseases are somewhat confusing as practitioners are generally agreed that there is considerable difficulty in arriving at a differential diagnosis between certain of the less typical cases of septic sore throat, and scarlet fever, especially when both are associated with the same epidemic. The wide variation in the mandatory criteria for the diagnosis of septic sore throat being reported also introduces considerable question into the available figures. Certain states require the reporting as septic sore throat of all cases in which beta hemolytic streptococci are found on throat swabs, while others require clinical manifestations before a positive diagnosis of septic sore throat is permissible for reporting. For these reasons the available figures in the reported cases of septic sore throat, and in some measure scarlet fever, are open to criticism.

There are certain states, particularly New Jersey, in which septic sore throat is not a reportable disease. In this instance, a number of the septic sore throat cases are probably reported as scarlet fever. On the other hand, in some of the southern states, the reported cases of septic sore throat are sufficiently high to indicate that either considerable stress has been laid upon the reporting of this particular infection, or there is some confusion in the

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differential diagnosis. For these reasons it is difficult to determine the true incidence of scarlet fever, and, more particularly, septic sore throat in the United States.

Certain investigators have reported septic sore throat and scarlet fever to be more common in the northern than in the southern states; and the conclusion has sometimes been drawn that the incidence of scarlet fever and septic sore throat varies with climatic conditions in the different sections of the country.

A study of the records of the U. S. Treasury Department from 1925 to 1934 indicates that the reported number of cases of scarlet fever and septic sore throat may be lower in the southern states than in certain of the northern districts. However, when this incidence is considered in light of the density of population, it may be found that in the main scarlet fever and septic sore throat are as prevalent in the southern states as in the more northern.

From a study of the latest census report, particularly from the standpoint of the 9 districts recognized as geographical districts by the Census Bureau, it may be found that there are real correlations between the incidence of scarlet fever and certain factors connected with the distribution of population in these districts. If the incidence of scarlet fever, based on cases per 1,000, is compared with the urban population of the 9 sections, it is found (Graph I), generally speaking, that an increased urban or city population in any particular district is accompanied by an increase in the cases per 1,000. This correlation is subject to criticism because of possible inaccuracy in the figures and also because the correlation is not exact. However, it becomes evident that by arranging the 9 districts on the basis of the per cent of the total population included in cities of 2,500 (urban) and over, there is a correlating increase in the cases per 1,000 of scarlet fever. One noticeable exception centers in the Pacific coast section which includes Washington, Oregon, and California. It can be seen from the reported figures that the incidence of scarlet fever in the Pacific coast states is relatively low, even if the urban population is taken into consideration.

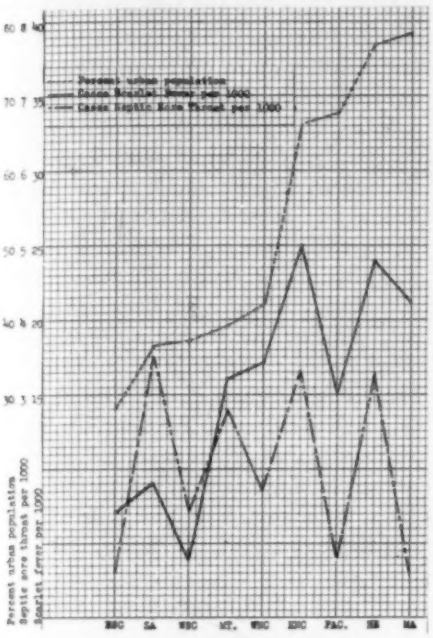
The lowest number of cases (Table I) per 1,000 of scarlet fever appears to be in the southern states, particularly the South Atlantic, East South Central, and West South Central districts. The more northern states which are included in the Middle Atlantic, New England, and East North Central districts have

TABLE I

Relation of Septic Sore Throat and Scarlet Fever to Per Cent Urban Population

Section of United States	*Per Cent Urban Population*	*Cases per 1,000 (10 Yrs.)*		*Deaths per 1,000 (10 Yrs.)*	
		Septic Sore Throat	*Scarlet Fever*	*Septic Sore Throat*	*Scarlet Fever*
New England	77.3	3.386	24	0.108	0.216
Middle Atlantic	77.7	0.513	21	0.079	0.190
East North Central	66.4	3.378	25	0.155	0.360
West North Central	41.8	1.723	17	0.085	0.251
South Atlantic	36.1	3.783	9	0.088	0.124
East South Central	28.1	0.689	7	0.047	0.134
West South Central	36.4	1.450	4	0.134	0.091
Mountain	39.4	2.894	16	0.104	0.216
Pacific	67.5	0.891	15	0.027	0.125

GRAPH I—RELATION OF SEPTIC SORE THROAT AND SCARLET FEVER TO URBAN POPULATION



ESC — East South Central
Kentucky, Tennessee, Alabama, Mississippi

SA — South Atlantic
Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida

WSC— West South Central
Arkansas, Louisiana, Oklahoma, Texas

MT. — Mountain
Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada

WNC— West North Central
Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas

ENC — East North Central
Ohio, Indiana, Illinois, Michigan, Wisconsin

PAC.— Pacific
Washington, Oregon, California

NE — New England
Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut

MA — Middle Atlantic
New York, New Jersey, Pennsylvania

an appreciably higher rate. From these figures, which are not entirely accurate, it seems safe to draw the general conclusion that the incidence of scarlet fever shows some relation to the percentage of urban population.

It is generally recognized by epidemiologists that scarlet fever is primarily a contact disease, which partly explains the higher rate per 1,000 in the larger population centers. On the other hand, it is the experience of those who have studied septic sore throat that it spreads from a common source of infection and not through contact. Repeated observations in milk-borne epidemics of septic sore throat have shown that one member of the family may be infected, and in only a small percentage of instances is the infection spread through the family unless they have used the infected milk. In epidemics in New York State with 75 to 300 reported cases and directly traced to milk carrying the responsible streptococci, only from 3 to 10 cases can be accounted for through contact. It is evident that scarlet fever and septic sore throat in the main are spread by different methods.

A study of the relation of the incidence of septic sore throat to urban population (Graph I) more definitely indicates this difference. From figures now available, it is evident that there is no correlation between the number of cases of septic sore throat reported and the percentage of urban population, and it can be noted that from year to year there is a decided variation in the number of reported cases in any particular district. This is in contrast to the rather constant number reported annually for a given district for scarlet fever.

There is a great variation in the reporting of septic sore throat in the various states. Certain states report large numbers and others only a few cases. A study of the cases per 1,000

(Table I) as reported for the different districts of the United States indicates that certain sections either have a low rate of septic sore throat, are failing to report all of the cases, or are not conforming with generally accepted practice with regard to criteria of diagnosis. Of particular note in this connection is the Middle Atlantic section which includes New York, New Jersey, and Pennsylvania. In New York State particular effort has been made to report all cases of septic sore throat and, in addition, to exhaust the possibilities of incriminating raw milk supplies. In New Jersey, included in this same district, septic sore throat is not reportable. For this reason, the Middle Atlantic section as a whole shows a very low rate per 1,000 for septic sore throat. Certain other districts are of interest in light of a general belief that the incidence of septic sore throat is lower in the southern states than in the more northerly sections. The rate per 1,000 for 10 years in the New England states is 3.3, in the South Atlantic states 3.7 per 1,000.

Reference should be made in this connection again to the Pacific coast states, Washington, Oregon, and California, with reference to their extremely low rate of septic sore throat. Only 2 other districts, which include states in which septic sore throat is a reportable disease, have as low rate per 1,000.

These figures indicate that septic sore throat cannot be correlated with urban population, with village population, or with the rural population in any of the given districts; nor can it be found that septic sore throat is confined to any section of the United States based on climatic or temperature conditions. In certain sections of the southern parts of the country the incidence is as high or higher than the more northern states.

Although over 53,000 cases of septic sore throat have been reported in the United States in the last 10 years, only 12,430 cases in 129 epidemics have been traced directly to milk supplies. It is evident, as pointed out by Brooks (1933),[1] that there are in all probability a large number of missed epidemics in various sections of the country. The missing of these epidemics may be due to several causes. Physicians may not be called in, or health officers in smaller communities may not have been properly advised as to the epidemiological significance of milk in connection with these cases of septic sore throat. This is particularly true in light of the observation that septic sore throat is not primarily a contact infection but is due to some common source which carries the infection, such as milk.

TABLE II

Septic Sore Throat in States Not on Record as Reporting Milk-borne Epidemics

State	*Number of Cases*	*Cases per 1,000 (10 Yrs.)*
Alabama	102	0.046
Arizona	60	0.060
Colorado	95	0.095
Delaware	36	0.151
Florida	334	0.238
Idaho	69	0.155
Illinois	1,175	0.154
Kansas	634	0.352
Kentucky	913	0.351
Louisiana	328	0.156
Maryland	1,296	0.800
Michigan	3,999	0.814
Mississippi	5	0.002
Missouri	2,256	0.066
Montana	359	0.668
Nebraska	1,156	0.889
Nevada	20	0.022
New Mexico	150	0.354
North Dakota	75	0.110
Oklahoma	2,555	1.110
Rhode Island	222	0.323
South Carolina	84	0.050
South Dakota	99	0.140
Tennessee	754	0.290
Vermont	167	0.470
Washington	92	0.061
Wyoming	192	0.850

Twenty-seven states have reported no milk-borne epidemics of septic sore throat since 1925. An analysis of the reports of septic sore throat (Table II) in these 27 states indicates that the incidence of infection is relatively high in several. Over 1,100 cases have been reported in Illinois, nearly 4,000 in Michigan, and over 2,500 in Oklahoma. Some other states have a comparable incidence of infection. It has been noted that in certain cases from 0.8 to 1.1 cases per 1,000 have been reported during the past 10 years, but no epidemics in which raw milk is involved have been considered as the source.

The reports from some of the eastern states, particularly New York, contrast sharply with those from the states which have not reported septic sore throat epidemics. In New York a rather extensive educational campaign has been under way and a large percentage of the health officers have been so instructed that they are constantly on the alert to connect their reported cases with milk supplies. More epidemics of septic sore throat than any other state—a total of 35 epidemics, approximately 2,700 cases—have been reported. The definite connection of these with milk-borne epidemics materially lowers the number of cases based on rate per 1,000 which are reported whose cause is unknown. It is reasonable to believe that if the same practice was followed in states not reporting septic sore throat epidemics that a similar condition would be found.

Although septic sore throat is not associated with any particular type of population, an analysis of the 60 epidemics about which we have some definite information (Table III) indicates that the majority of these have occurred in smaller communities. This is particularly true in New York in which during recent years the epidemics have been associated, with few exceptions, with rural regions in which the milk supply has not been pasteurized. Of these epidemics only 2 have been reported as traced to pasteurized milk, and in 1 the milk was reported as being improperly pasteurized.

TABLE III

Population of Cities or Villages in Which 60 Septic Sore Throat Epidemics Occurred During the Last 10 Years

Population	*Number of Epidemics*	*Number of Epidemics from Raw Milk*
2,500 or less	26	26
2,500 to 10,000	18	18
10,000 to 100,000	14	12
100,000 or more	2	2

It is therefore concluded that septic sore throat in the main is traced to raw milk supplies in the districts in which an active campaign is made to study more carefully the source of infection. It is also safe to postulate that the incidence of septic sore throat might be materially lowered in other sections if a more careful study was made of cases to determine whether a raw milk supply might be incriminated.

Considerable investigation has been made of the cause and epidemiology of septic sore throat. The definite connection of the human types of pyogenic streptococci with septic sore throat and scarlet fever immediately brought into bold relief the public health significance of udder infections, particularly mastitis. Some believed that all cases of bovine mastitis (inasmuch as this particular infection is caused by streptococci) might be responsible for septic sore throat. Subsequent work has indicated that the organism responsible for septic sore throat epidemics is entirely distinct from the streptococcus associated with ordinary bovine mastitis, in which the bovine streptococcus is passed from cow to cow and remains indef-

TABLE IV

Occurrence of Hemolytic Streptococci in Udder of Cow 17661

	Quarters			
Date	*L.H.*	*R.H.*	*L.F.*	*R.F.*
1929				
Mar. 16	Many colonies *	—	—	—
Mar. 21	Many colonies	—	—	—
Mar. 27	Few colonies	—	—	—
Apr. 16	—	—	—	—
June 10 †	—	—	—	—
July 16	—	—	—	—
Aug. 8	—	—	—	—
Aug. 12	Four colonies ‡	—	—	—
Aug. 21	—	—	—	—
Sept. 3	—	—	—	—
Sept. 10	—	—	—	—
Sept. 18	—	—	—	—
Oct. 2	—	—	—	—
Oct. 16	—	—	—	—
Nov. 1	—	—	—	—
1930				
Jan. 6	—	—	—	—
Feb. 4	—	—	—	—

* Isolated *Streptococcus pyrogenes* 1276 C.
† New lactation
‡ All proved to be *Streptococcus agalactiae*.

initely in the mammary tissue. When the udder is infected with the human type of pyogenic streptococcus, the organism is not passed from cow to cow and generally (Table IV) does not remain for any length of time in the udder. Observations on a particular cow which was responsible for the septic sore throat outbreak at Savannah, N. Y., showed that although a large number of these human pyogenic types were isolated from the udder during and just subsequent to the epidemic, the number of organisms gradually decreased and after a few weeks the milk was found to be free of this type of beta hemolytic streptococcus. No other cows in the herd were infected with this organism. In addition to the selective infecting tendencies, there are many cultural characteristics which separate the typical bovine mastitis streptococcus from the human pyogenic type (Table V).

By laboratory study, certain well defined groups of beta hemolytic streptococci can be readily distinguished. This is an important point if an intelligent attitude is to be adopted toward dairymen when a septic sore throat epidemic is being investigated. Health officers should instruct their laboratory directors to be especially careful in properly identifying the streptococcus and in making sure that it is of the human pyogenic type rather than the

TABLE V

The More Important Groups of Beta Hemolytic Streptococci

Type	*Precipitin Group*	*Produces Acid from*			*Attacks Sodium Hippurate*	*Final H-ion Concentration Production*	*Survive Pasteurization Temperature*	*Remarks*
		Sorbitol	*Trehalose*	*Lactose*				
Streptococcus pyogenes	A	—	+	+	—	pH 4.8 to 5.2	—	Pathogenic to humans
Bovine mastitis streptococcus	B	—	+	+	+	pH 4.4 to 4.6	—	Probably associated only with bovine udder
Animal pyogenes	C	+	—	+	—	pH 4.7 to 4.9	—	With few exceptions only pathogenic for lower animals
Animal (horse) pyogenes	C	—	—	—	—	pH 4.8 to 5.0	—	Pathogenic for horses
Beta hemolytic from pasteurized milk				+	+	pH 4.0 to 4.4	+	

TABLE VI

Per Cent of Cows Which Show Pathological Changes as Evidenced by Physical and Laboratory Examination of the Milk

	Per Cent Showing					
Total Number of Cows Examined	*Abnormal Milk*	*Long Chained Streptococci Upon Direct Microscopic Examination of Milk*	*Streptococci in Milk by Cultural or Other Methods*	*Leucocyte Count Greater than 500,000 per c.c.*	*Positive Brom Thymol Blue Reaction*	*Presence of Fibrotic Tissue*
7,000	4	4.5	45	25	20	60

ordinary bovine mastitis streptococcus. The latter is commonly present in udders.

At the outbreak of an epidemic of septic sore throat, although cows with definite clinical cases of mastitis should be under suspicion, the mere presence of udder infection is not proof that any particular cow is incriminated. A study of some 7,000 cows (Table VI) indicates that about 4 per cent will intermittently produce milk which is abnormal in appearance as a result of a clinical case of mastitis and about 45 per cent will discharge long chain streptococci in the milk. However, in all of these cases the type of streptococcus shows that it is of bovine origin and that it has no public health significance as a cause of scarlet fever or septic sore throat.

In studying epidemics of septic sore throat, some health officers have incriminated pasteurized milk because laboratories may have reported the presence of beta hemolytic streptococci. A group of beta hemolytic streptococci, *Streptococcus durans*, Sherman and Wing,[2] may be found in large numbers in samples of properly pasteurized milk. This group is particularly heat resistant and on blood agar plates resembles the human pyogenic type. If these organisms are encountered either during a septic sore throat epidemic or in routine milk control work, a study of their cultural characters should be made before any health significance is placed upon their presence.

It should be the practice of health officers, when an excessive number of septic sore throat cases are reported, to determine whether they can be traced to a raw milk supply. The evidence that raw milk is the source of infection has been generally complete. In most instances, the same type of human pyogenic streptococcus is found in the throat of the milker, in the udder of the incriminated cow, in the bottled raw

TABLE VII

Beta Hemolytic Streptococci Isolated from Septic Sore Throat Epidemic at Waterloo, N. Y.

		Acid Produced from				
Source	*Precipitin Group*	*Sorbitol*	*Trehalose*	*Lactose*	*Final H-ion Concentration Production*	*Attack Sodium Hippurate*
Throat	A	—	+	+	pH 5.0	—
Raw milk	A	—	+	+	pH 5.1	—
Quarter	A	—	+	+	pH 5.2	—
Infected finger	A	—	+	+	pH 5.0	—

supply, as well as in the throat of the infected patient. However, there has been certain criticism of this type of evidence inasmuch as the milker has been consuming the infected supply, and it may be that he has been infected as one of the consumers of this milk supply.

In coöperation with the New York State Department of Health, opportunity has been given for a complete study of a septic sore throat epidemic at Waterloo, N. Y., in which it was possible to determine that the milker was infected prior to the outbreak. Human type beta hemolytic streptococci of identical nature were isolated from the infected patients, from the milk (Table VII), from the bottled raw milk, from the infected quarter, and from an infected finger of the milker. This finger had been infected for several weeks prior to the epidemic and it was obvious that the milker was not infected from the cow—the reverse was evident. This is the final evidence which indicates that the human type of streptococcus originates from the milker to infect subsequently the consumer.

The control of a septic sore throat epidemic is not difficult if facilities are available for the proper pasteurization of the milk. None of the human pyogenic streptococci have been found to resist proper pasteurization temperatures. Immediate pasteurization of the raw milk supply removes the source of infection.

In those cases in which facilities for pasteurization are not present it is imperative that the milk supply under suspicion be immediately rejected as human food and a careful study of each quarter of each cow in the herd be made. Fore milk should be secured from each quarter and the presence or absence of the human pyogenic streptococcus be determined. Useful laboratory methods are outlined in Section K of *Standard Methods of Milk Analysis* of this Association. When the offending cow is detected, she should be immediately removed from the herd, and care should be taken that the udders of the remaining cows are not infected with the same type of human pyogenic streptococcus. Efforts should be made to locate the carrier—the milker or milk handler who has infected the cow. When all of these possibilities have been eliminated, the milk may be used again in the normal supply.

It is also highly desirable that a more uniform practice be adopted in the diagnosis of scarlet fever and septic sore throat to facilitate standard practices in the various states and to make available more reliable statistics on these infections. There is need for this Association to take some organized action suggesting the criteria for the diagnosis of these infections, particularly from the standpoint of suggesting more uniform procedures to be used by health officers in dealing with septic sore throat and scarlet fever.

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2. Sherman, J. M., and Wing, Helen Upton. *Streptococcus durans n. sp. J. Dairy Sci.*, 20:165 (Mar.), 1937.

A Study of Air Pollution in New York City*

SOL PINCUS, C.E., F.A.P.H.A., AND ARTHUR C. STERN, M.E.

Sanitary Engineer and Deputy Commissioner, Department of Health, New York, N. Y.; and Superintendent, WPA Air Pollution Survey, New York, N. Y.

IT has long been recognized that constant supervision of the supply of food and water to maintain high standards of purity is a responsibility of public health authorities. However, the same principle has not, in general, been applied to the maintenance of purity of the air in spite of the fact that our daily consumption of food and water is only 5½ lb. whereas we breathe as much as 25 lb. of air per day. To be sure, it has been shown that the public health may be rapidly undermined by polluted food and water, whereas epidemics traced to polluted air are rare. The public health significance of smoke, dust, gases, pollen, and microörganisms in the air has been studied from time to time with largely negative conclusions. Prevailing medical opinion seems to be that atmospheric dust, bacteria, moulds and yeasts have little or no pathogenic import and that the spread of disease by any of these media is a remote possibility. However, there has been a unanimity of expert opinion that the presence of smoke and fumes in the air will cause a diminution of the amount of ultra-violet light reaching the earth. This fact has been correlated with the treatment of diseases such as tuberculosis, rheumatic fever, and rickets, so that it is now common practice to remove patients from cities and transport them to sunnier areas. The diminution of ultra-violet light combined with the presence of acid gases in the air and of the polluting elements previously noted, may cause a general lowering of the "tone" of large masses of people and lessen their vitality. Herein lies our concept of the principal public health significance of air pollution. This view places smoke and fumes as the most significant factors in air pollution, acid gases next, and the remaining factors last.

If these same elements are evaluated from a strictly non-medical point of view, the same order of importance is arrived at. From an engineering standpoint, smoke means the incomplete combustion of fuel and consequently waste. In large cities it has been estimated as amounting to millions of dollars worth of fuel each year. Smoke, soot, cinders and fly ash are charged with the dirtying of vegetation, streets, buildings, homes, clothing, and humans, causing cleaning bills amounting to enormously high figures. If to this be added the destruction of vegetation, structures, and personal property by the corrosive effects of the acid gaseous constituents,

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it can readily be seen why prevention of air pollution was for many years known to the public as "Smoke Abatement." The exhaust fumes of internal combustion engines introduce gases, both malodorous and otherwise, capable of producing nausea, headache, and, in extreme concentrations, death. The fume and odor emission from non-fuel burning sources is also frequently of a noxious and offensive character.

Considering the principal source of air pollution to be the combustion of fuel, it was logical that, when in September, 1935, the Works Progress Administration organized the Air Pollution Survey of New York City, under the sponsorship of the Department of Health, the first studies were those of fuel consumption and smoke production.

Through the coöperation of the Port of New York Authority, the U. S. Army Engineers, and the traffic divisions of the railroads having terminals in New Jersey, a complete record of all fuel movement into New York City during the year 1934 was obtained. These data were analyzed as to fuel type, month of movement, and both borough and public utility distribution.

The annual consumption of solid fuel is 20,000,000 tons, of which 53 per cent is anthracite. The annual consumption of fuel oil is 600,000,000 gallons. This means that approximately 5 per cent of all the coal consumed in the United States is burned within the area of 309 square miles that constitute New York City; that 20 per cent of the nation's anthracite is consumed to make New York the largest anthracite consuming area in the country. These data are shown graphically in Figures I and II. Figure I indicates that the bulk of the soft coal is burned in the furnaces of public utilities. There is an increase of anthracite consumption during the winter months (Table I) but a uniform bituminous coal consumption throughout the year. This analysis shows that, during a typical year, there were discharged into the atmosphere of New York City, exclusive of the discharge

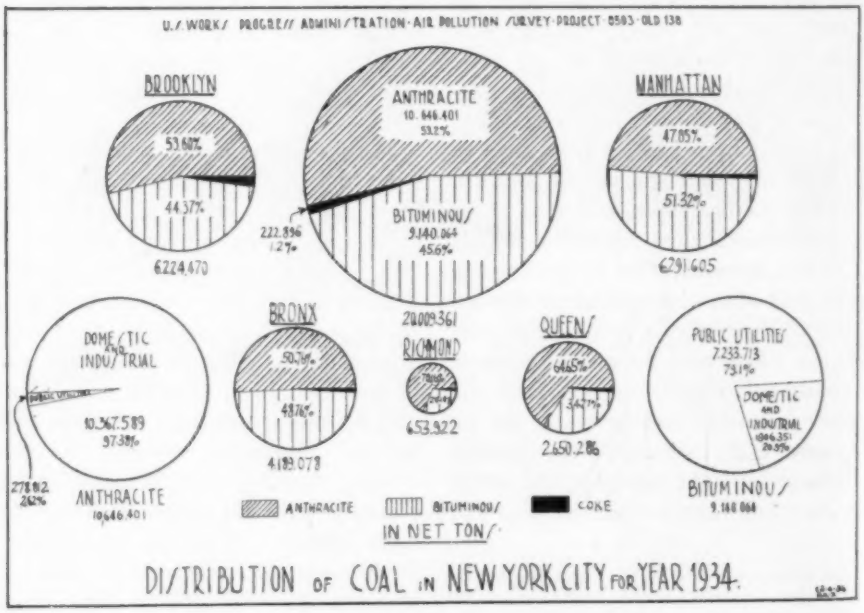

FIGURE I

TABLE I

Monthly Movement of Coal Into New York City for Year 1934—Net Tons

Month	*Anthracite*	*Bituminous*	*Coke*	*Total*
January	1,305,976	848,540	22,028	2,176,544
February	1,274,244	808,896	38,939	2,122,079
March	1,244,619	866,899	48,026	2,159,544
April	714,477	741,260	7,732	1,463,469
May	735,635	716,581	6,351	1,458,567
June	640,462	708,280	6,730	1,355,472
July	672,186	688,245	3,321	1,363,752
August	587,579	706,728	6,664	1,300,971
September	693,336	709,868	13,451	1,416,655
October	777,883	759,538	23,470	1,560,891
November	703,912	778,733	20,484	1,503,129
December	1,296,092	806,496	25,700	2,128,288
Total	10,646,401	9,140,064	222,896	20,009,361

from internal combustion engines, 300,000 tons of soot, tar, cinders, and fly ash, and 350,000 tons of sulphur in an oxidized form which probably forms about 1,000,000 tons of sulphuric acid. The largest consumption of both total solid fuel and bituminous coal occurs in the borough of Manhattan where 31 per cent of the total fuel is consumed. In this borough 35 per cent of the bituminous fuel is consumed, and for it much more detailed survey information was obtained concerning fuel distribution and use than for any of the other 4 boroughs. Simultaneously with the study of fuel movement into New York, the Air Pollution Survey conducted a house-to-house survey of Manhattan. The data obtained were summarized into block, census tract, health area, and

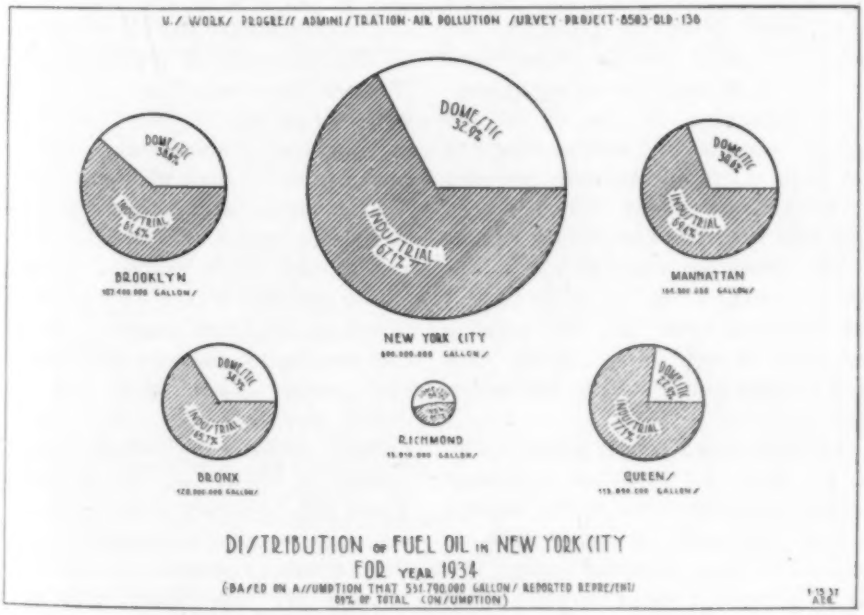

FIGURE II

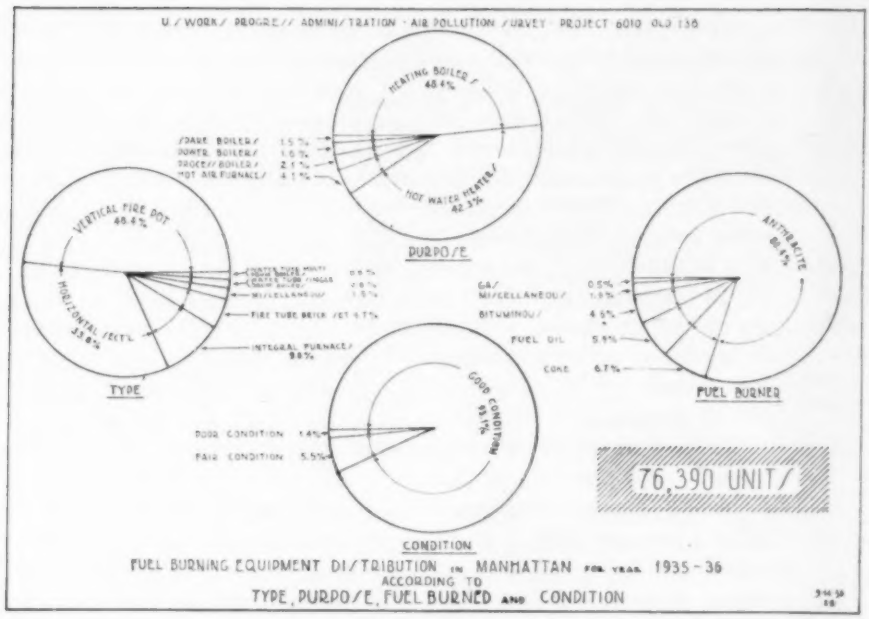

FIGURE III

health center district totals for each of the items surveyed. Access was obtained to over 95 per cent of the 72,784 Manhattan premises and it was ascertained that 66 per cent of these had installations of fuel burning equipment, hence, were potential producers of smoke. In these premises were found 76,390 units of fuel burning equipment. The consumption of fuel oil in the borough, obtained by summarizing the data from 3,238 oil burning premises is 141 million gallons, which checks quite well with the 146 million gallons obtained from the study of fuel movements. Similarly the 7,120,000 tons of coal obtained from the fuel burning equipment survey checks closely with the 6,290,000 tons from the fuel movement study.

The summarized results given in Figure III show the types of equipment installed in Manhattan for the burning of fuel. In order to secure data on potential sources of smoke among vessels in the harbor, one of the most active in the world, records were obtained of the fuel consumption of each of 1,200 steamships. The largest single class of steamships operating is tow boats. A summary based on 488 of the 548 such craft known to be operating, indicates that 64 per cent of the fuel consumption is bituminous and 16 per cent fuel oil, both capable of producing smoke. However, based on 97 of the 101 ferry boats, 69 per cent of their fuel is smokeless, indicating considerably less of a smoke problem than with tow boats.

In contrast with other large cities locomotive smoke in New York City is a relatively minor problem, as almost all the railroads within the city are electrified or use Diesel engines. The few coal burning locomotives operating, plus such sources as open dump fires, steam rollers, steam shovels, cranes, and tar kettles constitute the remaining possible sources of smoke as yet unsurveyed. These will be surveyed during the coming year, in order to complete the picture of smoke sources in Manhattan. Surveys are now being made of the other boroughs. Data such as these

for the entire city form the ideal background of information upon which an intelligent campaign of smoke elimination can be based.

Maps are prepared showing the geographical distribution of fuels likely to cause smoke and may be used to form the basis for equivalent maps showing the geographical distribution of smoke production. However, a preferable procedure is to prepare these smoke production distribution maps based directly upon measurements of smoke in the various parts of the city. All smoke survey procedures are based upon the familiar Ringleman Chart. Surveys conducted in other cities such as Chicago, Salt Lake City, and St. Louis, have been based upon the average smoke density of a number of individual stacks each read at random for a period of at least 15 minutes This is at best an unsatisfactory method, particularly when applied to a large city. Therefore, for our work, a new method of smoke survey was devised and tried, using a group averaging 20 smoke observers located on 20 of the 64 tall buildings distributed throughout the 5 boroughs as observatories. The smoke survey form and details of the method have had several changes during the year, with a view of obtaining the fullest information about smoke production so that both a geographical and a seasonal variation of smoke production could be obtained from an analysis of the survey data. The size range of stacks are graded according to Table II. The most recent modification of smoke density measurement procedure allows a geographical and seasonal coverage of every section in New York with but 10 observers rather than a coverage of but one-fifth of the city with the original requirement of 20 observers. It will thus soon be possible to map smoke production for New York City, just as potential sources of smoke production have been mapped. Maps of this nature are also of value to show progress in the elimination of smoke.

Coupled with the burning of fuel and the production of smoke is the production of cinders, fly ash, soot, and tarry particles emitted from these chimneys. This material will eventually settle out of the air on to the earth's surface. The larger particles will settle directly due to their own weight; the smaller will

TABLE II

Classification of Stacks
Smoke Survey

Class	*Type of Stack*	*Diameter in Feet*	*Flue Gas Emission cu. ft. per Minute*
A	1–2 Family Dwellings Tenements 1–2 Story Commercial Buildings Rooming Houses	0–1	0–1,000
B	Apartment Houses 6–7 Story Office Buildings Small Factories—Garages—Theatres 6–7 Story Hotels—Schools—Churches Public or Semi-public Buildings	1–3	1,000–10,000
C	Large Commercial—Industrial Buildings Large Hotels—Lofts—Warehouses Breweries—Laundries—Bakeries—Hospitals Processing Plants—Incinerators	3–9	10,000–100,000
D	Public Utility Power Plants	9–up	over 100,000

float for a considerable distance but will eventually either settle out due to their own weight, be washed out by rain or snow, or flocculate to form larger particles that will then settle or be washed out of the air. It is thus obvious that prevailing wind direction and velocity will have a very large effect in determining when and where these particles will settle but that the principal factor in the distribution of particle settlement will be when and where these particles are produced. It is thus possible to ascertain the general direction of the sources of particulate matter by determining where it settles and what sort of wind carried it to the point of settlement. In addition to the value of tracing pollution to its source, it is of interest to know the actual distribution of settled matter in so far as it visibly represents the dirtiness caused by air pollution. This settled matter, the so-called "soot-fall," is the cinder that gets in one's eye, the dirt that settles on the roof and the street and on the floor in one's home. It includes the tarry matter that dirties windows, building walls, vegetation, and clothing, and the soluble particulate matter dissolved and precipitated by the rain. There obviously must be a close relationship of the quantity and character of this sort of emission to the smoke that originally accompanied a large part of it, and the fuel from which it was produced.

Soot-fall is collected in copper cans 5 inches in diameter and 8 inches deep exposed for a month on flat roofs of one and two story buildings, and is reported in terms of tons of settled matter per square mile per month. In this Air Pollution Survey an average of 130 such cans were exposed in all 5 boroughs each month. Their contents were analyzed in the Chemical Laboratory for 2 fractions, insoluble and sol-

TABLE III

Typical Soot-fall Data for the Month of April, 1936—Tons per Square Mile per Month

		Insoluble Matter				*Soluble Matter*						
Type Area	*Station*	*Solids*	*Ash*	*Carbon*	*Tar*	*Solids*	NH_3	*Cl as NaCl*	SO_3	*Ash*	*Total Solids*	*Total Ash*
Industrial												
21 King St.	130	139.06	76.69	62.37	1.37	18.68	0.37	2.27	7.49	15.87	157.74	92.56
80 Van Alst. Ave.	312	174.55	137.80	36.75	....	17.83	0.63	2.18	12.49	10.46	192.38	148.26
Commercial												
1 W. 125th St.	112	59.86	42.23	17.63	4.69	10.35	0.41	1.48	4.09	7.06	70.21	49.29
33rd St. & 8th Ave.	104	91.36	55.92	35.44	0.48	20.97	0.37	2.64	6.78	6.37	112.33	62.29
Slum												
Rivington & Chrystie	131	103.24	59.82	43.32	2.25	9.16	0.35	0.94	11.14	6.12	122.40	66.00
38 Catherine St.	133	226.96	91.63	135.33	3.18	16.87	0.52	1.40	14.56	10.38	243.83	102.01
Harbor												
Aquarium	103	51.49	30.82	20.67	0.24	9.94	0.26	0.63	4.62	4.33	61.43	35.15
131 Water St.	135	198.75	93.09	105.65	0.17	17.00	0.44	3.14	6.82	9.98	215.75	103.07
River												
692 11th Ave.	118	24.43	16.42	8.01	0.48	9.53	0.22	1.48	1.16	4.75	33.96	21.17
Franklin & Dupont	411	96.13	69.30	26.83	0.15	16.43	0.61	2.11	4.43	8.41	112.56	77.71
Residential (Multiple)												
1414 Inwood Ave.	204	33.05	20.03	13.02	....	11.45	0.26	1.13	3.90	2.42	44.50	22.45
156th & St. Nicholas	109	42.12	30.10	12.02	0.65	9.20	0.41	1.77	4.05	5.95	51.32	36.05
Residential (Private)												
212th & Hillside	322	10.25	7.50	2.75	....	1.96	....	0.15	1.66	1.96	12.21	9.46
1215 E. 15th St.	409	38.06	31.34	6.72	0.22	....	0.28	0.87	3.47	....	.....	.....
Suburban (Control)												
Beth Page	705	3.90	1.72	2.18	....	13 18	....	1.11	1.83	0.57	17.08	2.29
Westbury	703	7.63	5.34	2.29	....	27.92	0.17	1.00	4.75	....	35.55	.....

uble. The insoluble fraction is further divided into insoluble solid matter, ash, combustible matter, and tar (carbon disulphide soluble matter). The soluble fraction is broken down into soluble solids, SO_3, NH_3, Cl (as NaCl), and ash. Control stations were used in Westchester and Long Island. These cans collect, as well, settled matter of non-fuel burning origin, such as plant matter, salt from sea spray, and inorganic atmospheric dusts from numerous sources. However, the percentages of soluble matter, combustible matter, tar, SO_3, NH_3 and Cl serve as good indicators of the source of the greater part of the settled matter in each gauge. Typical data from this survey are reported in Table III. As can be seen from this chart, the slum areas are the worst, with the harbor, industrial, and commercial areas next in order. Residential sections are low; private residential sections are of the same order as the suburban areas, and are lower than multiple dwelling areas.

Each of the components for each month are also drawn up on a 5 borough map to show the geographic distribution. Figure IV shows the distribution of total solids for the month of April, 1936. It should be noted, that regardless of wind direction a map of this sort shows which health district has the heaviest deposit and this is primarily what the survey is interested in, as it visibly represents the dirtiness caused by air pollution.

Because SO_2 emitted from the stacks of fuel burning plants diffuses rapidly and is mixed into the atmosphere by wind and convection, it is not possible to trace this gas to its source with the same facility as particulate matter.

Because of the very small quantities of SO_2 in the air, it is necessary to absorb this polluting element from a relatively large volume of air in order that the absorbent contain a sufficient concentration for accurate laboratory analysis. By the method used, which is to pass 1 cubic foot of air per minute for 60 minutes through the Greenburg-Smith type impinger tubes, which are used as absorbing bottles, the concentration of SO_2 in the absorbent is still so low as to require very sensitive methods of determination. Most of these depend upon the oxidation of SO_2 to SO_3 and the corresponding reduction of an iodine compound, which releases free iodine as a colorimetric indicator.

The particular technic used in this survey consisted in absorbing in a 10 per cent NaOH solution, adding HCl and CCl_4, and titrating with KIO_3 until a pink color due to iodine appears and then disappears in the CCl_4 layer. It will be noted that this method does not measure SO_2, but rather measures total active reducing gases present in the air. This fact was checked by measurements of total sulphate gravimetrically and it was thus shown that other reducing agents than SO_2 were active in New York City air. In an attempt to explain this finding, a number of special studies were made. It was found that in clean glassware, SO_2 (absorbed in NaOH solutions) does not change much on standing; that there is no appreciable oxidation of SO_2 to SO_3 on passing air through the solution for an hour; that higher gas concentrations are absorbed with more efficiency than lower concentrations; and that the colorimetric phenomenon representing the end point of the titration differs in appearance between equivalent concentration of pure SO_2 and of reducing substances in city air. An interesting speculation, on which research is now being undertaken, is that some of these other reducing substances are from automobile exhaust gases.

Regardless of the exact nature of the polluting gases measured by this technic, a part is SO_2 and measurements by

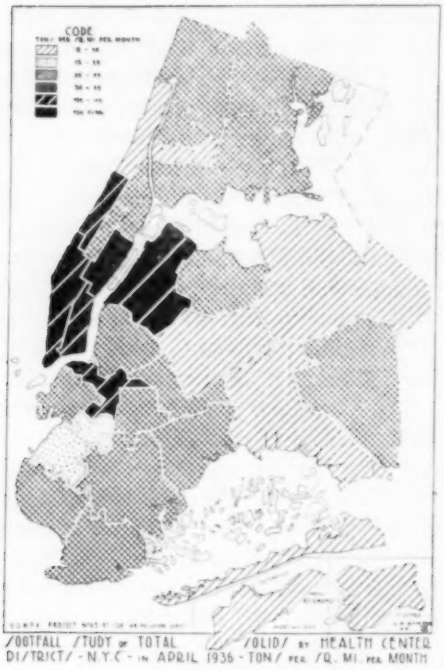

FIGURE IV

this method give an index to the potential corrosive acidity of the air. In other words, this method does give a measurement of the extent that the air is polluted by the gases that damage vegetation, structures, and fabrics.

Just as SO_2 and the associated gases in the air have been measured by absorption in NaOH solutions in the Greenburg-Smith Impinger, so have NH_3 and other alkaline gases been absorbed in dilute H_2SO_4 and the ammonia measured in a Kjeldahl apparatus. Ammonia is a normal constituent of air, the small quantities usually present coming from the decomposition of organic matter. However, in the several months for which data are available, ammonia in New York City air has consistently been close to normal and therefore consistently below levels likely to cause physiological effects.

The procedure has been to sample simultaneously for SO_2, NH_3, and atmospheric dust using 3 impinger bottles actuated by a common pump. The bottles used for dust collection contain distilled water and are counted microscopically in the laboratory, using Sedgewick Rafter counting cells with Whipple disc and light field according to the standard U. S. Public Health Service technic, although at the present writing correlative studies are being made of the use of darkfield illumination. The range of the impinger dust counts by standard light field procedure has varied between a maximum of 148 million particles per cubic foot near sand-blasting operations on building faces to a minimum of 85,000 particles per cubic foot in the street air of a residential area, with an average of about 200,000 particles per cubic foot of air in the street. Dust counts were also made by the Owens Jet Dust Counter under light field and high power and show an average count in the street air of 16,500,000 particles per cubic foot.

Dust content in schools, theatres, and other places of congregation will be measured this year and correlated with bacteria count. A study of dust content in New York City subways has been made. The results in subways shows that the greatest concentration of dust is found on all lines between 34th Street and 96th Street, Manhattan; also that the concentration of dust in the tunnel was about 3 times as high as that obtained just as soon as the train left the tunnel and emerged into the open air. The concentrations on platforms in the subways were greater than those found in the train at the same station.

The original plans for the gas analysis procedure to be employed for the measurement of atmospheric CO called for the use of the blood-pyrotannic acid method. However, after a careful trial, this method proved unsatisfactory for the particular sampling conditions de-

sired and was abandoned. It was replaced by a commercial CO indicating meter based upon temperature measurement of the heat of the catylitic combustion of CO to CO_2 in a hopcalite bed. This has proved more satisfactory and has allowed the measurement of CO in streets and in automotive vehicles. These latter studies in vehicles have indicated that the headache and nausea occasionally experienced in automotive vehicles frequently occur when the CO concentration is below that capable of producing those symptoms. Since these symptoms almost invariably occur only when odor is present, and since CO is known to be odorless, the conclusion is that the aldehydes, both saturated and unsaturated, cause the symptoms noted. Quantitative measurements of these gases by absorption are now being attempted, but we have as yet been unable to obtain a satisfactory absorbent.

This completes that part of the survey devoted to the measurement of air pollution caused mainly by the combustion of fuels. Two of the remaining parts are quite independent of this source: pollen and bacteriological (including moulds and yeasts), while the final study occupies an intermediate position: ultra-violet light study. This latter is an attempt by means of quartz spectrographs and Geiger-Mueller quantum counters sensitive to the ultra-violet region to determine the amount of the various wave lengths of ultra-violet light reaching the street level in the heart of New York after having traveled through the city's smoke and dust haze. In so far as this diminution of ultra-violet is one of the few definitely proven harmful effects of air pollution upon health, this type of measurement should by itself serve as an index of the extent to which the pollution is remedied by efforts at smoke and dust abatement.

During the pollen season—March to October—we have exposed daily microscope slides, coated with glycerine jelly dyed with basic fuchsin, for a period of 24 hours at each of 9 different locations in the 5 boroughs of New York. These are being counted for the presence of each of the common tree, grass, and weed pollens likely to be found in New York, particularly noting, of course, the ragweeds. Pollen counts of this sort such as shown in Figure V are arbitrary to the extent that they do not propose to determine the number of pollen per unit volume of air, but merely the relative number falling on one slide compared with that falling on a similarly exposed slide at some other location or some other time. These pollen counts were published daily in a New York newspaper during the latter part of ragweed season in the form of a bulletin listing the total number of pollen and the total number of ragweed. A number of physicians have subsequently stated that these were of value to them in determining the daily treatment of their patients.

The bacteriological survey was instituted because of the belief that the subject warranted extensive reinvestigation. A new method of study was made feasible by the perfection in 1933 of a machine, the Wells Air Centrifuge, which, it was believed, would yield reliable data.

While numerous studies of bacteria in air were made during the 19th century, the results were of negligible significance. However, during the first two decades of the present century, a number of workers in public health in the United States (Winslow, Baskerville, Rettger, Weinzirl, Soper, Browne, Ruehle, Whipple and others) using various modifications of the double sand filter originally designed by Petri and, in one instance (Rettger) using an improved water aeroscope, made studies

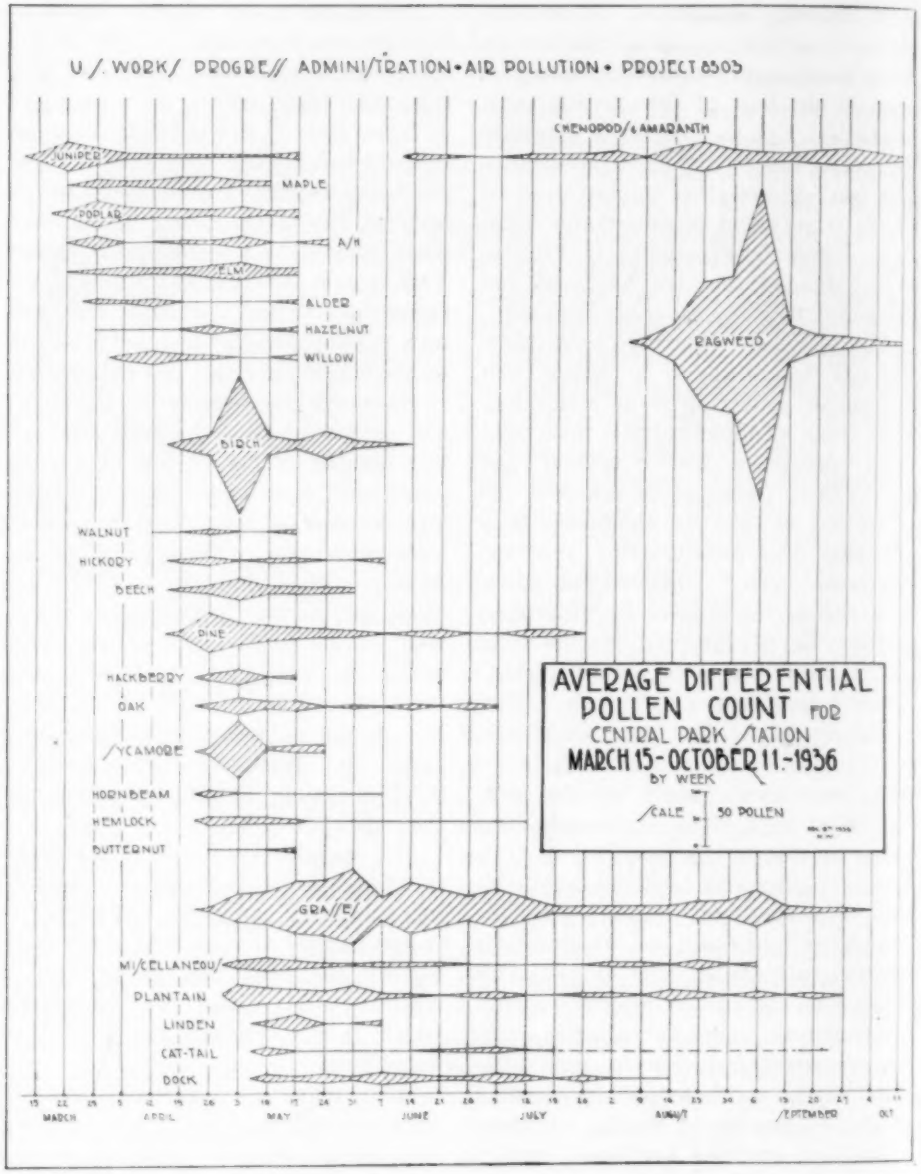

FIGURE V

of air in schools, streets, subways, dairies, and other places. Most of their efforts were concerned with the estimation of the number of bacteria per unit volume of air, and in some instances, the number of streptococci that appeared on litmus lactose plates. The wide variations in results leads one to suspect unavoidable errors in technic. Most of the methods demanded a separate piece of apparatus for each step in the process of isolating bacteria; that is, one apparatus to create air flow, another to measure it, still another to remove bacteria from the air, and a final one to grow them for counting.

No doubt the complications entailed, combined with cumbersomeness of apparatus, hampered routine collection of samples. This may account for the waning interest in air analysis and its lapse into disfavor. The study of air bacteriology was greatly stimulated, if not actually revived, by the development of the Wells Air Centrifuge, in 1933—referred to above. This centrifuge creates an air flow, measures the flow, precipitates the bacteria onto a thin layer of agar, and then permits of their being counted after incubation of these media on the same bottle.

The objectives of this study are to obtain a composite picture of the number and kind of bacteria in the air of places of assembly such as schools, theatres, and subways in which could be delineated the variations induced by population density, season, time of day, and meteorology, and to determine the degree of relationship, if any, of these findings to the public health.

The ease with which samples are obtained by the Wells centrifuge simplifies the planning of routine collection of samples and allows the maintenance of fixed schedules for sampling. For example, 6 public schools have each been sampled twice a week on the same days of the week, in the identical rooms, and at the same hours of the day, for a period of approximately 6 months (until the schools closed for the summer vacation). Similarly, air in subways has been studied at the same hours 5 days a week. The same routine was followed in theatres, both before and during performances, and at the remaining types of locations. As is seen from

TABLE IV

Bacteria per Cubic Foot of Air in New York City at Various Locations
Incubated 18 Hours at 37° C.
(2,734 Samples)
Week Ending Friday, January 10, to Week Ending Friday, June 26, 1936

	Sheep's Blood Beef Infusion Agar		*Beef Infusion Agar*	
Type of Location	*No. of Samples*	*Bacteria per cu. ft. of Air*	*No. of Samples*	*Bacteria per cu. ft. of Air*
Schools	707	29.6	678	21.1
Subway	290	19.2	294	12.4
Theatre—Non-ventilated (Auditorium)	104	13.2	110	8.4
Theatres—Ventilated (Ducts)	149	3.1	114	1.4
Streets	143	11.2	134	8.5
Park	13	3.0	18	1.8

Streptococci per Cubic Foot of Air in New York City at Various Locations
(Sheep's Blood Beef Infusion Agar)
16 Week Period—January 23 to May 15, 1936

Type of Location	*No. of Samples*	*All Streptococci*	*Beta Hemolytic Streptococci*	*Alpha Hemolytic Streptococci*
Schools	553	0.20	0.01	0.18
Subway	225	0.10	0.0003	0.085
Theatres—Non-ventilated (Auditorium)	78	0.04	0.001	0.038
Theatres—Ventilated (Ducts)	116	0.03	0.0005	0.026
Streets	123	0.05	0.0001	0.045

Table IV which presents data on the number of bacteria and the number of streptococci per cubic foot of air collected in several types of locations during the first 6 months of 1936, of 2,754 samples (approximately one-half on blood agar and one-half on plain agar), more than 57 per cent, or 1,585, were taken in schools, 21 per cent in subways, and 22 per cent in theatres, streets, and parks. The number of bacteria grown on blood agar samples exceeds that on plain agar samples in every type of location. There is no explanation for this except the obvious one that blood agar allows full growth of certain delicate organisms which are unable to propagate on plain agar. Each batch of media used for sampling, both plain and blood agar, is tested in the laboratory for its ability to grow streptococci and pneumococci. Plain media, therefore, would be expected to grow these organisms from the air. Another point of interest is the apparent distinct differences in the total counts at the several types of locations. A definitely greater number of bacteria were found in school air than in that of any other type of location. The air of subway cars, while showing fewer bacteria than schools had more than that of theatres, streets, and parks. The auditoriums of theatres (non-ventilated) had more bacteria than streets, the park, and the ventilating ducts of theatres. Streets had more bacteria than the park and the ventilating ducts of theatres. The latter two locations had approximately the same number.

Since these results cover only a part of the samples which it is hoped to have collected when this study is completed, they are being presented solely to indicate the trend of the data. Presumably, the difference between the several types of locations will remain in the same order of magnitude. It may be stated tentatively, therefore, that schools and subway cars have greater concentrations of bacteria per cubic foot of air than do theatres and outdoor locations.

Table IV also gives the estimated number of streptococci per cubic foot of air in the same types of locations for a 16 week period from January 23 to May 15. It is seen that, here again, the schools have more streptococci than do any other type of location, and the subway is again second. The streets, in contrast with the findings for all bacteria per cubic foot, have slightly more streptococci than do the auditoriums of non-ventilated theatres. The ducts of ventilated theatres again have the lowest number. The division of the streptococci into Alpha and Beta streptococci show that the Alpha streptococci are in great preponderance. It is of very great interest that approximately 90 per cent of the Alpha hemolytic streptococci from schools and subway air are organisms whose normal habitat presumably is the human naso-pharynx, as determined by the Holman system of classification of streptococci.

SUMMARY

Little attempt has been made in this paper to present complete or final data, this being reserved for a subsequent report of the survey now in the process of preparation. Some of the highlights and some typical results have been presented. The plan of the most comprehensive study of air pollution ever attempted in New York City has been outlined. These studies lack the air of authority given by years of repetitive results which have served to verify the studies of the Meteorological Office in Great Britain and of certain other American cities. However, they do more than make up for this deficiency by including in the short range program a more intensive geographical coverage

of a municipality, and a wider scope of correlated studies than it has ever been possible to obtain heretofore.

The results obtained from this investigation will be made the basis for an extensive revision of the sanitary regulations relating to smoke and air pollution to provide for such requirements as the approval of plans for new installation or extensive alterations of fuel burning equipment, and for standards for allowable emission of smoke, soot, fly ash, cinders, acid gases, fumes, and other polluting elements. With such detailed data on local conditions available and an adequate code on air pollution, it will be more readily possible to reduce to a minimum air pollution in this metropolitan city, and to be able to measure the results obtained.

ACKNOWLEDGMENT

Without the men and money made available to the Health Department by the Works Progress Administration, this program which has long been in the minds of officials interested in the abatement of air pollution, would have still remained a hope rather than the present actuality employing over 150 men to provide the basic data upon which future abatement programs may be planned. Acknowledgment must be made of the valuable aid of Dr. John Oberwager, Director of the Sanitary Bureau, New York City Department of Health, in planning and directing this survey, and of Dr. Leon Buchbinder, Director of the Bacteriological Laboratory and of Jacob Siegel, Director of the Chemical Laboratory of the Air Pollution Survey, in developing methods, supervising the work, and preparing and compiling the data of this study.

Popular Interest in Science

. . . Nevertheless, he [Voltaire] did science one good turn: he impressed the general public with her importance. This is all that a literary man can do for science, and perhaps only a literary man can do it. The expert scientist is too conscious of the difficulties of his subject; he knows that he can only communicate his discoveries to us by simplifying and therefore falsifying them, and that even when he can state a fact correctly we receive it incorrectly, because we cannot relate it to the thousands of other facts relevant. The literary man has no such misgivings. His imagination is touched by the infinite variety of the natural world; he reads books about it, skipping the statistics, he forgets most of what he does read, and perhaps he performs a few experiments in order to grasp the meaning of research. Then, in the course of his other activities, he writes about science, with a spurious lucidity that makes the expert smile. Spurious, but stimulating; the public does realize, from the remarks of such men as Lucretius, Voltaire, Charles Kingsley, Samuel Butler, Aldous Huxley, Gerald Heard, that something is happening It does get a misty idea of the expanding empire of mankind. . . . The literary man loves images, and as soon as he has found a vivid one, his interest in the truth it is supposed to illustrate is apt to cease. But the scientist knows that Nature is Nature.

Voltaire himself was literary, yet he had enough sense of science to perceive his own limitations, and . . . if "popular interest in science" has any importance (for my part, I think it has immense importance), he must be honoured as an early popularizer." — E. M. Forster, *Abinger Harvest*, 1936, p. 213.

Relation of Bovine Mastitis to Human Disease*

PAUL B. BROOKS, M.D., F.A.P.H.A., AND
WALTER VON D. TIEDEMAN, F.A.P.H.A.

Deputy Commissioner of Health; and Chief, Bureau of Milk Sanitation, State Department of Health, Albany, N. Y.

BOVINE mastitis occurs throughout the United States and, probably, wherever cattle are bred and milked. In our northern states it is very common. Few herds are at all times free from it and in occasional badly infected herds the proportion of infected animals has been as high as 80 or 90 per cent. In the South, where cattle are out of doors much of the time, it is said to be less prevalent.

ORGANISMS INVOLVED

In a large majority of cases the incitants are streptococci which have been loosely classified under the synonymous names of *Streptococcus agalactiae* or *Streptococcus mastitidis*, which differ in certain biological properties from the strains commonly associated with human infections. However, on occasions which are relatively rare, considering the high incidence of bovine mastitis, udders become infected with hemolytic streptococci of human origin. Except for laboratory identification of the causative organisms, there apparently is nothing to distinguish these cases from those incited by the organisms commonly responsible for mastitis. Staphylococci have been held by various observers to be responsible for from 10 to 30 per cent of mastitis studied and colon bacilli are said to be responsible for some cases.

In tuberculosis and infectious abortion (Bang's disease) in cattle, infection may be localized in the udder. Rosenau [1] estimates that from 1 to 2 per cent of tuberculous cows have udder infections but, considering the likelihood of many such lesions being overlooked in routine examinations, it seems probable that this is a very conservative estimate. We have been unable to find any definite data on the proportionate number of udder localizations among cows infected with abortion but Mitchell, of the Animal Disease Research Institute, Hull, Canada, in a letter, says he believes they occur frequently. An examination at Detroit, in 1931,[2] of 136 blood reactors (in dilutions of 1 to 100) revealed, it was reported, that 73 did not give positive milk agglutinations. From this it is inferred that the remaining 63 did give such reactions. Gilman [3] has expressed the opinion that when a positive milk agglutination in a dilution of 1 to 80 is observed, udder infection should be suspected. On this basis udder infection may have been present in 46 per cent of these reacting animals. The unofficial and independ-

* Read before the Health Officers Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 21, 1936.

ent "guess" of a man who has worked extensively with abortion in cattle is only a little below this figure.

RELATION TO HUMAN DISEASE

The danger arising from tuberculous infection of the udder is too well known to necessitate discussion. It is safe to assume that it has been responsible for a large part of our human tuberculosis of bovine origin. The eradication of bovine tuberculosis is gradually eliminating this source of human infection.

In New York State for the past 2 years the average number of undulant fever cases reported per year has been 265, most of them apparently milk-borne. Considering the very general prevalence of abortion in cattle this is, relatively, a very small number. Just why the number is so small there and elsewhere never has been satisfactorily explained, and we believe that the possibility that milk-borne infection occurs largely as a result of udder foci has not yet been sufficiently explored.

It has been quite generally considered that the streptococci falling in the agalactiae or mastitidis group, commonly present in mastitis, are not pathogenic for man. It certainly is true that large numbers of persons have consumed them in raw milk without harm being discovered and cultures have been administered to laboratory animals, including young dogs,[4, 5] without ill effect. On the other hand, Swithinbank and Newman, in 1903,[3] expressed the opinion that they were "not infrequently the cause of serious gastrointestinal disorders in infants." Toxic substances in milk from cows suffering from chronic streptococcic mastitis have been held responsible for several outbreaks of gastroenteritis in New York State, including 3 involving from 82 to 127 persons each, mostly school children. In these latter instances the streptococci found in large numbers in the milk were reported to be similar to those commonly associated with mastitis. That toxin, rather than bacterial infection, was responsible for the trouble was evident from the fact that attacks occurred in from 2 to 5 hours after consumption of the milk. Since individual cases of gastroenteritis are not required to be reported, it is quite probable that many smaller outbreaks of this sort are never discovered and recorded.

There also is some ground for belief that streptococci commonly associated with mastitis may be responsible for certain low grade infections in man. Saunders, Hulsinger and Cooper,[6] in 1934, reported isolating from 30 resected ulcers of the stomach and duodenum a streptococcus "identical with 3 others isolated from cows' milk and not identical with any other streptococcus examined." Recently Torrey and Montu[7] compared representative strains of Saunders' streptococcus with strains associated with mastitis. While they did not consider them identical, they said: "These and other findings suggest a bovine origin for certain enterococcus-like organisms capable of invading human tissues." In fact, Hare[8] reports the isolation from the blood of 2 fatal cases of uterine infection following childbirth of "strains which resemble those isolated from bovine mastitis in every way." Consideration also should be given to effect on the character of streptococcus infections of possible changes, under just the right conditions, in the virulence, selectivity and conceivably even the type of strains of the common bovine organisms, as well as in tissue susceptibility of the human host.

We now come to a class of udder infections the importance of which, from a public health standpoint, can scarcely be questioned, *i.e.* those responsible for milk-borne outbreaks of septic sore throat and scarlet fever. In

New York State, exclusive of New York City, we have had 19 of septic sore throat and 4 of scarlet fever in the 8 year period ending with 1935. Twelve of the 19 outbreaks of septic sore throat and 1 of the 4 scarlet fever were traced quite definitely to cases of mastitis. We believe that cases of mastitis are involved in most of the extensive epidemics of septic sore throat and probably also of scarlet fever, and we have been finding the responsible cows with increasing frequency since this part of our investigations has been in the hands of a man who knows cows and farmers, as well as the elementary principles of epidemiology. Often there have been histories of udder or teat injuries immediately preceding the mastitis and in one or two instances teat dilators have been used. One dairyman with a streptococcus throat admitted using his own saliva as a lubricant. Several of our outbreaks have been traced to exceptionally good dairies, the milk of one having had an average bacterial count of 4,000. The cow responsible for one was said to be the most valuable in the herd. The organism found in the human cases has been a hemolytic streptococcus and it usually has been possible to find in the cow an organism having similar morphological, cultural, and biochemical characteristics. In connection with the question of possible changes in strains of various organisms and in host susceptibility it is interesting to note that cases of erysipelas and cases diagnosed as scarlet fever occur not uncommonly in connection with epidemics of septic sore throat.

Our observation supports the belief of others that the organisms responsible for cases of mastitis associated with such outbreaks are always of human origin, *i.e.*, persons, usually milkers, with infected throats or occasionally wounds, even though it has not always been possible to find the individual. In our laboratory the organisms clearly responsible for epidemics usually have not shown the characteristics of the so-called "*Streptococcus epidemicus*."

One of us,[9] has commented on the apparent relative freedom of many states, including some in the South, from milk-borne epidemics of septic sore throat, as compared with Massachusetts and New York, which "contribute" about a third of all recorded in the United States. We pointed to the high recorded death rate from this disease in certain of these states and the fluctuating rate in one as suggesting that outbreaks were being overlooked. Since then the reported relatively low incidence of mastitis in the South has been offered as an explanation. However, we know of no evidence that previous existence of mastitis predisposes to these accidental infections with human organisms or that general freedom from mastitis offers any protection against them. We know that they occur in valuable animals, presumably retained because of the normality and productivity of their udders, and Davis and Capps [10] have demonstrated that udders can be infected artificially with human organisms without difficulty.

Thus far we have referred to staphylococci only to mention their association with a certain proportion of mastitis cases. We know of no differentiation having been made between those associated with bovine and human infections, and little seems to be known about their source in either case. Barber [11] reported a series of gastroenteritis cases which occurred in the Philippines over a 3 year period around 1910, and were attributed to *Staphylococcus albus* toxin in milk from a cow thought to be normal. Other outbreaks of food poisoning from staphylococcus toxin have since been reported. Crabtree and Litterer, in 1934,[12] reported an interesting and enlightening study of an outbreak

involving 97 persons in a school in Tennessee, traced to *Staphylococcus aureus* "enterotoxin" in milk from 2 cows found to have chronic mastitis. Groups of cases occurred at intervals and some patients had repeated attacks. Both albus and aureus varieties were found, the aureus greatly predominating. Albus filtrates were fed to volunteers without ill effect but aureus filtrates, in much smaller doses, produced illness in 12 of 15 volunteers. Samples of milk taken from the cows at intervals gave bacterial counts varying from 2,900 to 17,500. The authors inferred that the discharge of pus-pockets, from time to time, accounted for the occasional higher counts and for the recurrence of cases at intervals.

Gwatkin and others [13] tested 80 strains of staphylococci from milk for toxin production. Toxin was produced by 67.4 per cent of those from cows with mastitis, as compared with 20 per cent of strains from apparently normal cows. Dolman [14] fed filtrates containing staphylococcus toxin to 42 volunteers without ill effect, but a filtrate from one strain obtained from Jordan produced severe gastroenteritis in 3 of 9 volunteers. They concluded that only an occasional strain will produce what they call a "metabolite" capable of causing severe gastroenteritis in man and that the incidence of staphylococcus food poisoning, therefore, is not likely to be high. Our experience confirms these findings.

SUMMARY AND CONCLUSIONS

The most common incitants of bovine mastitis are streptococci of the agalactiae or mastitidis group, less frequently staphylococci, and occasionally colon bacilli. Tuberculosis and Brucella infections also localize in the udder, the latter possibly in a third or more of infected animals.

The streptococci usually associated with mastitis are commonly regarded as harmless for man. However, their toxins, in milk from cows with mastitis, apparently have been responsible for outbreaks of gastroenteritis. Some believe that these organisms, present in milk in large numbers, cause severe gastroenteritis in infants. Similar organisms have been isolated from low grade infections in man and from fatal cases of uterine infection.

Cases of mastitis are occasionally responsible for serious outbreaks of septic sore throat and scarlet fever. They are incited by hemolytic streptococci probably of human origin. The authors know of no evidence that relative general freedom from mastitis, as reported in the South, offers any protection against accidental infection with human organisms.

Staphylococcus toxins or "metabolites" in milk from cows with mastitis, have been responsible for outbreaks of gastroenteritis. Crabtree and Litterer reported a study of such an outbreak. They found both albus and aureus varieties, the latter greatly predominating. Filtrates of the aureus produced illness in several volunteers. Gwatkin and others observed that a larger proportion of strains from cases of mastitis produced toxin than of strains from apparently normal cows. Filtrates of only one of the strains studied caused illness in volunteers.

The general control of mastitis, if feasible, probably should be considered primarily an economic problem of the dairy industry. However, occasional cases of mastitis are responsible for serious epidemics of disease. There is nothing in the physical condition in such a case to differentiate it from the ordinary types of mastitis, and careful laboratory studies ordinarily are made only in the presence of an epidemic. There is evidence suggesting that organisms commonly present in mastitis

may invade human tissues. Pasteurization destroys all of these organisms and probably their toxins as well, but when milk is being sold without pasteurization all cases of mastitis should be regarded as potentially dangerous and milk from any cow suffering from the disease carefully excluded.

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DISCUSSION

ANDREW L. MAC NABB, D.V.M., F.A.P.H.A.

Director, Provincial Health Laboratories, Ontario Department of Health, Toronto, Ont.

DR. BROOKS has stated that the incidence of bovine mastitis reaches as high as 80 and even 90 per cent in some communities. In Canada, Rosell found that chronic streptococcic mastitis was found to affect 20 to 50 per cent of high milk producers. This disease, therefore, causes a greater loss to the dairymen than any other. Rosell also found that chronic streptococcic mastitis actually constituted 98 per cent of all the cases in high producing cows. At the Provincial Laboratories, Ontario Department of Health, during the past year, when testing the milk samples from 360 cows in 8 producing herds, the incidence of mastitis was found to vary from 5 to 90 per cent.

ORGANISMS INVOLVED

The vast majority of cases of bovine mastitis are caused by streptococci. There are 2 distinct sources of bovine mastitis infection due to streptococci: (1) the great majority of cases are caused by the *Streptococcus agalactiae* (Kitt), frequently called *Streptococcus mastitidis;* (2) the infection caused by a streptococcus of human origin, sometimes called *Streptococcus epidemicus* (Davis). Udder infections with streptococci of human origin occur at rare intervals. The symptomatology presented in the bovine species is similar in both these infections. Laboratory examination is essential to determine the nature of the incitant organisms.

BACTERIOLOGY

The most important cultural characteristics of *Streptococcus agalactiae* are ordinary flocculent aspect, with clear supernatant fluid in glucose broth, its non-beta hemolytic properties, and its ability to hydrolyze sodium hippurate, a final H-ion concentration of below pH 5.0. Streptococci of human origin show beta hemolytic colonies, fail to hydrolyze sodium hippurate and have a final H-ion concentration above pH 5.0.

The bovine udder may serve as a reservoir of infection for both tuberculosis and contagious abortion (Bang's disease). In the examination of 37 milk samples from cattle whose blood gave a positive reaction for Bang's infection, *Brucella abortus* was isolated in 8, or 22 per cent. Gwatkin reported *Brucella abortus* in 43 per cent of the milk samples examined. While it is true that the udder of animals infected with Bang's disease serves as a reservoir for *Brucella abortus* infection, and that a goodly portion of these excrete the organism in the milk, *Brucella abortus* does not frequently cause gross lesions, but may serve as a predisposing factor in the development of streptococcal or staphylococcal lesions. In Ontario, from 1929 to 1936, 758 cases of clinical undulant fever infection in man have been recognized. All of these have been in raw milk drinkers. While the majority of these had contact with infected animals, among them 1 clergyman, 2 physicians, 1 dietician, and several residents, suffered from this infection and yet had no contact whatsoever with animals. Any animal whose blood reacts to *Brucella abortus* antigens should be regarded as a potential source of infection.

Chronic bovine mastitis presents itself in two ways: (1) the acute, and (2) the sub-acute, or sub-clinical type, as it is often called. The acute form probably is not a public health problem, as the course is acute and the mortality is very high. Hucker has stated that probably 8 in every 1,000 cows fall prey to this infection. As probably 90 per cent of all bovine mastitis is caused by the *Streptococcus agalactiae*, and members of this group are generally considered non-pathogenic for man, we may ask what part bovine mastitis caused by this organism plays in a public health program. Gwatkin tested 80 strains of staphylococci isolated from cows' udders. Toxin was produced by 67.4 per cent of those from cows with mastitis, as compared with 20 per cent of strains from apparently healthy udders. Hence, staphylococci, especially *Staphylococcus aureus*, isolated from cows' udders must be regarded with suspicion. Lastly, bovine mastitis must not only be considered from a milk supply, but also from a meat hygiene viewpoint. Fifty-eight animals suffering with streptococcal mastitis of varying degrees of severity were removed for slaughter. The flesh of 19 of these was rejected, as the carcasses showed evidence of pyemia. In a second group, 11 were removed, and the flesh of 1 was rejected because of pyemia. The udder secretion in this case was pus.

DIAGNOSIS

The functional diagnosis of mastitis is made by abnormality of the milk or udder secretion. Mastitis presents a very grave economic problem to the dairyman. Infected animals have a decreased milk supply, reduced butterfat, and the bacteriological quality of the milk is unsatisfactory, as evidenced by unpleasant odor, flavor, increased bacterial count, and increased leucocytic content. The relation of bovine mastitis to public health is that the milk is unsuited for human consumption. Milk substances elaborated by the cells are decreased in the diseased udder, *e.g.*, potassium, calcium, phosphorus, while those due to inflammatory reactions are increased—chlorides, leucocytes, catalases, etc. Such milk is not only less palatable, but the nutritive properties are greatly diminished.

The public health significance of udder infections with streptococci of human origin cannot be questioned. Davis and Capps demonstrated that within 24 hours after artificially infecting the teat, the milk contained human

beta hemolytic streptococci. In Ontario, we have had such outbreaks in raw milk dairies, the first in 1930, involving 457 cases, resulting in 6 deaths, and the second, in 1931, involving 16 persons. In each, a beta hemolytic streptococcus was isolated from a cow's udder.

Effective pasteurization is our safeguard against these infections. While pasteurization kills living organisms, public health attention should be given the quality and nutritive value of a milk supply. The leucocytic count may vary widely. Breed found the average cell count 868,000 per c.c. in the milk from 122 cows. Copeland found an average count of 651,000 per c.c. Hucker found 90 per cent of normal udders free from scar tissue showed less than 60,000 cells per c.c.

The diagnosis of bovine mastitis requires: (a) careful clinical examination by a competent clinician, with the aid of field tests such as chlorine, bromthymol blue, rapid catalase, and strip cups, (b) laboratory tests, such as the cultural test and leucocytic count, may be carried out on doubtful cases.

Educational programs relative to proper stable hygiene, the milking procedure, and avoiding the undue urging of dairy cattle to produce, will reduce these infections. An efficient veterinarian, with the aid of the laboratory, can be of great assistance in eliminating and controlling this vast economic and public health problem.

Epidemiology of Leprosy

FOR over a decade the writer has advocated a plan for rapidly reducing leprosy by discovering and treating effectively a large majority of cases in the earliest stages. This plan was based on the facts: (a) that most infections (probably about 80 per cent) are contracted by living in the same house with an infective leper; (b) that the earliest symptoms appear in most cases (probably some 80 per cent), especially in the case of children, within 5 years of exposure to infection; and (c) that by prolonged modern treatment in the early stages the great majority can be prevented from going on to an infective stage. The proportion of cases that can be prevented from advancing is 90 per cent, according to Moiser, who also found examination of the households of all known lepers far more effective in discovering early cases than are surveys of the whole population, invaluable as the latter have proved in India and the Sudan.—Sir Leonard Rogers, M.D., The Epidemiology of Leprosy, *International J. Leprosy*, 4, 4:482 (Oct.–Dec.), 1936.

Methods for Making and Significance of Cream and Butter Sediment Tests*

E. H. PARFITT, PH.D.
Dairy Department, Purdue University, Lafayette, Ind.

THE development and use of a satisfactory method for determining the extraneous matter in butter, by the U. S. Food and Drug Administration, has for the past several years focused the attention of food officials and members of the butter industry on the important subject of sediment. The butter industry has realized that, through the development of a suitable sediment test for cream and for butter, and its general application to cream grading and butter manufacture, effective improvements could be made in the quality of the finished product, and extraneous matter readily eliminated. In some states, inspectors are at present examining cream for its sediment content and have forbidden the purchase or sale of cream that contains excessive dirt and other extraneous matter.

The various methods for determining sediment in cream and butter have been studied, and it has been the hope of the Committee on Standard Methods for the Examination of Dairy Products, that enough data could be assembled to justify the adoption of one or more methods as tentative before the publication of the next edition of Standard Methods for the Examination of Milk. It would appear from the data on hand that further study of the application of the suggested methods is essential.

The development of satisfactory sediment tests for such varied products as sweet and sour cream and butter is not a simple problem. A dilution of the sample of sweet cream with hot water to melt the fat and in part disperse the curd is usually sufficient to permit satisfactory filtration, but with sour cream, and occasionally with butter made from sour cream, it is necessary to add various chemicals as the sample is diluted with hot water to obtain a satisfactory dispersion of the curd and permit rapid filtration.

METHODS FOR DETERMINING SEDIMENT IN CREAM

Size of Sample—At present a 2 oz. sample of cream seems the most advisable. Work done at Purdue University indicates that a 2 oz. sample is just as effective in measuring the amount of sediment as is a 4 oz. sample. If effective, the smaller sample should be used because of the waste involved in discarding numerous samples of material as valuable as cream.

Size of Filter Area—A 1¼" filter disk with an effective filtering diameter of 1" is the size that is generally used with a 2 oz. sample.

While either a lintine disk or nainsook cloth may be used, the lintine disk

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is preferable because of its customary use in the milk industry. If a nainsook cloth disk is used, the mesh should be 120 x 120 per in. In general, filtration is more rapid through nainsook cloth and the amount of sediment that is retained on the cloth is slightly less than that on a lintine disk, but usually the difference is not sufficient to make a difference in classification.

Preparation of Sample for Filtration—Various chemicals have been suggested for use in aiding the filtration of sour cream. These are added to the cream to disperse the curd and to make the material more fluid. The chemicals suggested are [1, 5] borax, lye, ammonia, bicarbonate of soda, and dilute hydrochloric acid.

The procedures are as follows:

1. Hot Water Method—Place the 2 oz. sample of cream in a glass beaker. Add 150 ml. of 83° C. filtered water to the sample and stir the mixture thoroughly. Assemble the tester placing the filter disk in its proper position. The mixture of cream and hot water is then run through the assembled tester as promptly as possible. Rinse the tester with at least 120 ml. of 83° C. water so as to wash any sediment adhering to the inside surface of the tester down on the disk. This procedure also removes any foam that may remain on the disk.

The disk should be removed from the tester and placed on a paper towel or similar absorbent material with the soiled or sediment side up. This will absorb the excess moisture, after which the moist disk, if desired, may be mounted on a card for examination.

2. Acid Method—Place the 2 oz. sample of cream in a glass beaker. Add 150 ml. of 83° C. hydrochloric acid solution of 0.03 normal strength (3.2 ml. concentrated HCl in 1 l. of filtered water). Stir the mixture of acid and cream thoroughly and proceed as prescribed in the hot water method.

3. Ammonia Method—Place the 2 oz. sample of cream in a glass beaker. Add 2–4 ml. of ammonia water (28 per cent ammonium hydroxide). Stir the mixture of ammonia water and cream thoroughly and then add 150 ml. of 83° C. filtered water, continuing the stirring during the addition of the water. Proceed as prescribed in the hot water method.

4. Soda Method—Place the 2 oz. sample of cream in a glass beaker. Add 2.0 gm. (½ teaspoonful) of bicarbonate of soda. Stir the mixture of soda and cream thoroughly and then add 150 ml. of 83° C. filtered water, continuing the stirring during the addition of the water. Proceed as prescribed in the hot water method.

The American Association of Creamery Butter Manufacturers through its Research Committee [2] organized an extensive study during the past year to determine the value of the different procedures used to prepare the sample of cream for filtering. Commercial dairy laboratories and several university laboratories coöperated. These laboratories were located in the following 16 states: New York, Ohio, Indiana, Illinois, Iowa, Nebraska, Missouri, Kansas, Michigan, Minnesota, North Dakota, Kentucky, Tennessee, Texas, Oregon, and California. In general, it was requested that each reporting laboratory check at least 3 random-selected samples of cream at periodic intervals. It was requested that each laboratory use those methods which have been advocated by various authorities, *i.e.*, (1) bicarbonate of soda, (2) dilute lye, (3) dilute ammonia, (4) dilute hydrochloric acid. All of the tests were made from a 2 oz. sample of cream, using a standard lintine milk disk and standard milk sediment testers.

In reporting results, the laboratories were asked to state whether the filtration was satisfactory, slow, or unsatisfactory. The results secured are given in Table I.

TABLE I

Per Cent of Satisfactory Filtrations of Cream

Using:	
Dilute hydrochloric acid	97.0
Dilute ammonia	87.0
Dilute sodium bicarbonate	86.0
Dilute lye	61.0

The grade of cream influenced the

ease of filtration less when the acid method was used than when the other 2 methods were used. Results did not agree in different parts of the cream producing area when the soda method was used for cream filtration. The ammonia method worked fairly well on all grades of cream in commercial laboratories, but the college laboratories did not secure as good results. The speed of filtration was not influenced by the season of the year when the acid method was used.

The author in his work at Purdue University has found ammonia preferable to bicarbonate of soda as a means of aiding filtration, and that dilute hydrochloric acid is preferable to ammonia, thus confirming the results secured in the survey.

SIGNIFICANCE OF SEDIMENT IN CREAM FOR BUTTER MAKING

Cream for butter making is secured by using a separator or by gravity separation. In either case it would normally be expected that such sediment as found its way into the milk would be removed in part. However, sediment testing of cream has shown that some cream sold to creameries contains appreciable quantities of sediment. The sediment in cream, like the sediment in milk, indicates carelessness on the part of the producer—evidence which cannot be questioned. This lack of care is not only reflected in the amount of sediment but may also be reflected in the grade of cream. In areas where sediment testing of cream has been practised a noticeable improvement in quality of cream has resulted.

SEDIMENT STANDARDS

Cream sediment disk standards have been prepared in a manner similar to the sediment disk standards for milk.[3] The standards suggested by the Purdue University Dairy Department are: class 1, cream containing no visible sediment deposit; class 2, cream containing a sediment deposit equivalent to the sediment deposit of 0.25 mg. of a soil and cow dung mixture; and class 3, cream containing a sediment deposit equivalent to 0.5 mg. of a soil and cow dung mixture.

These standards are identical with sediment standards used by many boards of health for milk and, as in milk, when objectionable material such as hair, insects or insect parts, or animal matter, is found upon the sediment disk, no attempt should be made to grade these as sediment, but they should be reported separately.

METHODS OF DETERMINING SEDIMENT IN BUTTER

Inasmuch as some samples of butter were found to be even more difficult to filter than cream, the Research Committee of the American Association of Creamery Butter Manufacturers included 1,773 samples of butter in their survey carried out in the laboratories mentioned above. A summary of the results obtained is shown in Table II.

TABLE II

Per Cent of Successful Filtrations of Butter on 1,773 Samples

Using:	
Dilute HCl or Hot Water	93.0
Sodium Bicarbonate	89.0
Borax	77.0

These results are in harmony with those secured at Purdue University, dilute hydrochloric acid being the method now used for all samples sent for sediment analysis.

The procedure for determining sediment in butter is as follows:

Using Lintine Disks—Weigh into a 400 ml. beaker 100 gm. ± 0.1 gm. of the butter to be examined. Add 200 ml. of 0.03 to 0.05 N hydrochloric acid. Heat the mixture over a water bath to 74° C., stirring thoroughly

to insure complete mixing. Run through a milk sediment tester. Rinse out the tester with at least 120 ml. of 83° C. filtered water. Mount and examine the soiled lintine disk.

Using Filter Papers (Horrall [4])—Weigh into a 400 ml. beaker 100 gm. ± 0.1 gm. of the butter to be examined. Add 150 ml. of 0.03 normal hydrochloric acid (3.2 ml. of 35–37 per cent hydrochloric acid diluted to 1 l. with distilled water) and place this mixture in an 83° C. water bath. Heat until butter is melted. Stir the mixture but once and let it stand until the milk fat rises. Place the filter paper (Max Dreverhoff No. 86, or equivalent) in a 7 cm. Büchner funnel containing a 50 mesh copper screen (diameter of which is slightly less than the series of holes in the funnel), seal the paper by suction and warm the funnel with distilled water at 83° C. After sealing, pour the prepared samples of butter very slowly on to the paper, permitting the fat to pour on to the filter paper first. If the filter clogs, pour distilled water at about 83° C. slowly on the paper until it filters freely; repeat this if necessary until the sample is filtered, then wash the beaker, funnel, and paper free from fat using hot distilled water. With a pair of tweezers place the filter paper in a Petri dish, or similar container, to prevent contamination.

CLASSIFICATION OF SEDIMENT FROM BUTTER

Procedures and standards have not as yet been definitely established for classifying sediment secured from butter. The industry and investigators in this field are attempting to develop adequate standards that will result in the continued improvement of creamery butter.

The Research Committee of the American Association of Creamery Butter Manufacturers has conducted a survey as to the value of the lintine disk for use in grading and classifying the sediment obtained in the filtering of butter. The data from this survey were presented [2] at the June, 1936 meeting of the American Dairy Science Association and the following conclusions reached:

1. The milk sediment testing equipment can be used with satisfactory results.

2. The Connecticut Official Milk Sediment Standards of 1931 can be used for interpreting the results.

The Connecticut Milk Sediment Standards of classification of 1931 are now being used by the majority of butter manufacturers in their laboratory control work where lintine disks are used.

In laboratories where filter papers are used, the sediment contained upon the filter paper is first measured by visual inspection; that is, if the paper appears practically clean, the sample is classed as clean; a sample which deposits a small amount of sediment is classed as fairly clean; while if appreciable amounts of sediment are found, the sample is classed as dirty. Then the paper containing the sediment is examined for animal and insect material with the aid of a wide-field microscope. As in milk, if objectionable material is found it is reported independently. The magnifications used are about 25 X and 80 X.

The sediment that may be found in butter consists mostly of burned curd, rust, and material which is designated, for want of a more definite classification, as black and brown specks. Much butter is salted, and the brine contained in the butter has a very corrosive action on the metallic parts with which butter comes in contact. The water used in washing the butter is also a potential source of rust. This is a probable explanation of the presence of rust specks. Systematic studies of the sources of sediment in butter have not been made as yet, but the examinations thus far made have resulted in a marked improvement in the sediment content of butter as found upon the market.

The examination of over 1,500 samples of commercial butter at Purdue University between August 1, 1934, and July 31, 1936, has shown a definite trend toward improvement in the sedi-

ment content. This can only be accounted for by an improvement in the sediment content of the cream from which the butter was made, and the regular examination of the butter for sediment has developed a sediment consciousness on the part of the manufacturer. The improvement that has taken place is shown by a comparison obtained from monthly examinations of butter manufactured in some 60 creameries. Of the samples examined during August, 1934, none could be designated as clean. A year later, August, 1935, 14.7 per cent, and in August, 1936, 56.1 per cent were designated as clean.

RELATION OF THE SEDIMENT CONTENT OF BUTTER TO ITS MICROBIOLOGICAL CONTENT

The yeast and mold count of butter serves as a measure of plant sanitation in the same manner as the bacterial count on milk may be used. Butter with a high yeast and mold count may indicate inefficient pasteurization, and equipment not properly cleansed and sterilized. The evidence secured on the analysis of 1,500 samples of butter over a 3 year period indicates that there is no relation between the amount or kind of sediment in butter and the number of living yeasts and molds contained in the butter.

Informing the manufacturer of the yeast and mold content of the butter he produces, has resulted in a decided improvement. At the beginning, 18 per cent of the samples developed less than 100 yeasts and molds per ml.; after 2 years of work, 65 per cent of the samples coming from the same plants contained less than 100 yeasts and molds per ml.

SUMMARY

From the work accomplished, it appears that sediment tests can be readily made on cream and butter. Hot water and chemicals aid in the filtration of these materials.

The same standards and significance can be attached to the sediment found in cream as to the sediment found in raw milk.

The application of the sediment test to butter has had the effect of reducing the amount of sediment found in cream and butter.

The amount and kind of sediment found in butter bear no evident relation to the nature of the living microorganisms in butter.

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Health Museum

THE former residence of Mrs. Francis F. Prentiss, of Cleveland, has been donated to house a museum of health and hygiene. The building was occupied by the Huron Road Hospital for several years.

The project will be administered by a nonprofit corporation to be known as The Cleveland Museum of Health and Hygiene, Inc. Sufficient funds will have to be raised to maintain the museum.

Improved Laboratory Apparatus

J. C. WILLETT, D.V.M., F.A.P.H.A.
Chief of Laboratories, Health Division, St. Louis, Mo.

Diphtheria Culture Outfit

OUR diphtheria outfit expedites the preparation of Loeffler's media and can be recommended as a time and money saver.

The outfit consists of a straight wall vial 75 x 12 mm., with aluminum cork-lined screw cap which permits a tight seal, thus preventing the untimely drying of the media. Tubes are filled by hand and capped with the machine illustrated in Figure I. Three hundred tubes of media are slanted in a copper rack devised for this purpose. Media are coagulated in the autoclave with entrapped air and then sterilized at a temperature of 121° C. for 30 minutes.

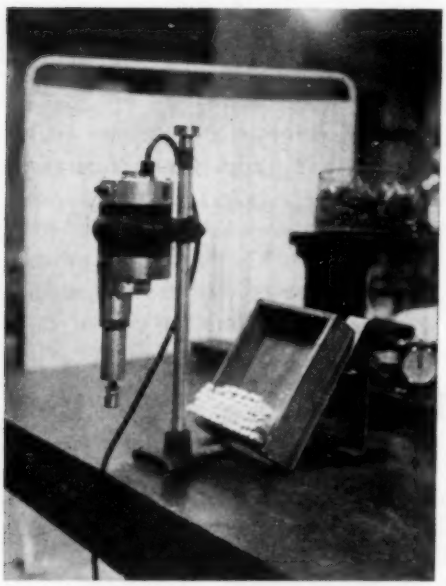

Figure I—Bottle Capping Machine

Figure II—Diphtheria Culture Outfit

Figure II shows our double clasp manila envelope which contains the swab envelope and the tube of Loeffler's media. Two swabs are placed in the small envelope and are sterilized in the autoclave, in bundles of about 500, after being wrapped in a thick layer of non-absorbent cotton. This prevents softening of the mucilage and disintegration of the envelope.

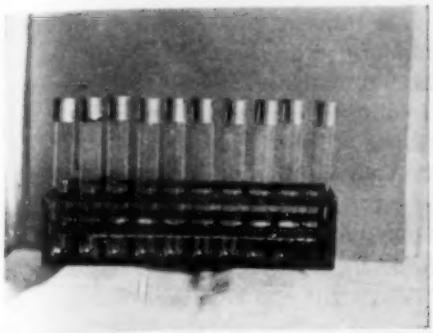

FIGURE III—Aluminum Cap Replacing Cotton Plug

We have also found this vial very satisfactory for dispensing single sugar liquid media and triple sugar agar media. They can be handled in the ordinary Wassermann rack.

A COPPER TUMBLER

The copper tumbler, replacing the glass tumbler, is used for a variety of purposes in the laboratory, but primarily as a container for handling pathogenic bacterial cultures. The tumbler (illustrated on top of 5 gallon bottles in Figure V) is spun from No. 26 gauge copper (U. S. standard plate). It is useless as a drinking cup because of the ¼" holes which are placed ¾" from the upper edge. The container is 3½" high, diameter at top 2½" and at bottom 2¼". Where the original cost is considerably more than the glass tumbler, we have found it more economical, convenient, and safe in the long run. In addition they can be stacked in large numbers in a minimum amount of space.

AN ALUMINUM CAP

These caps are used in place of cotton plugs in connection with the sanitary analysis of water with the tube illustrated in Figure III. Three small indentations are made in the top of the cap so that it will not seat tightly on the tube. The cap is made of 1/16" aluminum and is 1 x ⅛" deep and 1 x ⅛" wide. It has been found that this cap is less expensive than cotton plugs, requires less labor, and is easier of manipulation. We have experienced no difficulty with contamination. Racks are set up with 20 1" x 8" tubes containing 30 c.c. of lactose broth with caps and sterilized in the autoclave, then are used before any noticeable evaporation takes place. Discarded Kahn tubes are used as the inverted tube. Caps of smaller size are used for a variety of purposes in the laboratory.

ACID TANK FOR CLEANING GLASSWARE

The tank as illustrated in Figure IV is made of No. 12 gauge steel lined with ⅛" sheet lead. It is 11" x 19" x 22" and holds 30 liter when filled to the top of the lead baskets. The baskets are of 3/16" sheet lead, 10¼" x 6½", with ¼" perforations. The top of the tank is lead lined and fitted with a handle.

FIGURE IV—Lead Lined Tank, with Lead Baskets

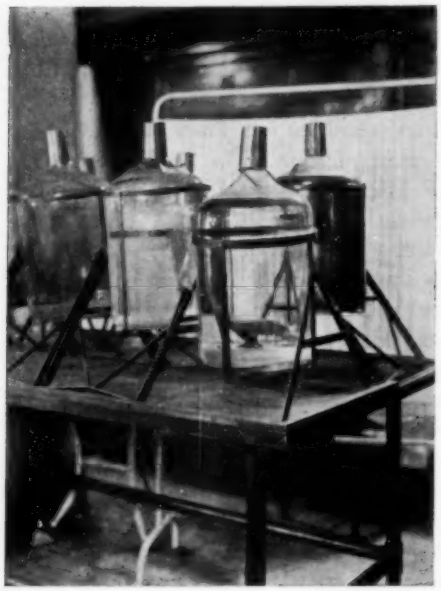

FIGURE V—Five Gallon Bottle Holder

The tank is filled with dichromate sulphuric acid cleaning solution up to the top of the lead baskets. Glassware is permitted to remain in the bath for 24 hr. or less. The baskets with their contents after being drained are transferred to the cleaning sink with a minimum danger to the operator. The glassware breakage is kept to a minimum.

5 GALLON BOTTLE HOLDER

With the use of the metal swinging rack illustrated in Figure V, it becomes a simple matter to handle the 5 gal. bottle. This is a standard commercial rack found frequently in gasoline filling stations and is quite inexpensive. In addition to distilled water we use this outfit for storing Gram's iodine, cresol solution, formalin solution, and other reagents.

Amebic Dysentery and Environmental Hygiene

. . . Perhaps the most practical feature which evolved from the outbreak was the grossly unsatisfactory (on English standards) conditions found as regards the sanitation and plumbing in these two hotels. This is interesting as related to the historical development of public health in U. S. A. and Great Britain. In the latter country public health developed as an extension from a control of the sanitary environment and while this aspect has receded in significance, in essential importance has never been overlooked. In U. S. A. the main developments took place on the floodtide of individual hygiene, so that the environmental side was given a very secondary place and often neglected. Quite inadequate environmental control may be found combined with a development of personal hygiene of the highest excellence. This outbreak is directing attention back in U. S. A. to the equal importance of environmental hygiene.—Review by W. G. Savage, of Epidemic Amebic Dysentery. The Chicago Outbreak of 1933. *Bull. Hyg.*, Jan. 1937, pp. 83–84.

Public Health and Physical Education

ROSS L. ALLEN, DR.P.H.
Assistant Editor, Journal of Health and Physical Education, Ann Arbor, Mich.

THE relation of physical education to public health is one that is very definite, but seldom given much thought. However, in the present trend toward increased coördination of social agencies we find that physical education and public health do have much to contribute to one another.

Probably the most obvious relationship is that concerned with the degenerative diseases. One of the many contributing causes of the increase in the morbidity and mortality from this group of diseases has been generally pointed out—the sedentary nature of our lives.

Physical education has enlarged its program and made a new emphasis to meet the need for providing exercise of an enjoyable and conservative nature, particularly for after school years. The current interest of physical educators in the sports program, especially in those activities in which one may participate during middle life, is indicative of the recognition of the situation revealed by public health officials. These carry-over sports are being taught more and more on the elementary, secondary, and college levels in order that interest may be developed and sufficient skill acquired to result in the youngsters wanting to engage actively in these activities after school days have passed.

The interest of teachers of physical education in carry-over sports is also evidenced in providing facilities, supervision, and teaching for the wise use of leisure time by adults. Adult education programs, including physical activities, offer an opportunity to reach the present generation of adults without waiting for the next generation to show the results of sports education. Schools are offering their accommodations and equipment for recreational purposes in the evenings—physical educators, together with recreational leaders, plan and teach the fundamentals of sport to thousands of men and women throughout the country. Recreational programs for teachers are becoming increasingly popular; this professional group recognizes the need for regular exercise; physical education teachers heartily support and are leaders in this movement to provide the beneficial effects of exercise for their colleagues. So we see that physical education is contributing to the laudable efforts of public health to decrease the inroads which the degenerative diseases are making in our human resources.

The after-school athletic programs along with the use of schools in the evening for physical exercise, are considered by many as physical education's contribution to the fight against venereal disease which is so current an issue in public health. The outlet which exercise under wholesome conditions provides for the abundance of energy which youth possesses, should be a deterrent to the chance for indulgence in unwholesome sex relations. Youth may be guided into social situations—in this particular case, supervised play—that give little time or opportunity for visiting dance halls, roaming about with the corner gang, etc. It is generally agreed that wholesome, active recreation will definitely alleviate the problem of

venereal diseases, and further the objectives of the social hygiene program. The vast majority of youth will unhesitatingly choose healthful recreation if it is made available to them. Physical education is helping here to solve probably the most urgent problem that confronts public health.

The great incidence of physical defects in the people of the United States is a major consideration of public health. It is likewise an important concern of physical education. The corrective activities which are a definite part of the work of physical education have resulted in early detection of physical defects. In directing children who have serious physical defects to the medical profession, the chance for complete cure and better adaptation of these unfortunate youngsters to life situations is immeasurably improved. Then, too, under the supervision of physicians (especially those trained in orthopedics), physical educators have helped to eliminate orthopedic defects prevalent in the children of America. Where complete elimination of defects has been impossible, the individual health training classes have helped to improve the physical condition of boys and girls displaying physical liabilities.

Many teachers of physical education have among their duties the teaching to their pupils of the elements of personal and community hygiene. School administrators have assigned this responsibility to the physical education instructors mainly for these reasons: their training, usually includes more instruction in health than the academic teacher; secondly, the budgets of most public schools are so meager that the provision of salaries for special teachers of health is impossible; lastly, the modern professional training of teachers of physical education is directed toward the need for health education in the schools. An interesting development in graduate work is the ever increasing number of physical education teachers who are making public health their major in their quest for higher degrees. The administrative duties of directors of health and physical education in the public schools require this fundamental knowledge of public health practices, together with the mastery of the offerings of physical education and education in general.

Perhaps other contributions of physical education to public health (for example, the mental hygiene benefits of an intelligently planned activities program) can be pointed out by the reader. But let these few examples suffice in order that we may turn to the contributions of public health to physical education.

Public health does and should publicize the major problems which endanger the health of our citizens. Perhaps the profession might well indicate specifically how the school, including physical education, may help in the early and effective solution of these problems.

Education in public health provided by experienced workers in this field should be made readily available to physical educators. The writer doubts if many in his profession read the *American Journal of Public Health* or even have access to it. Your knowledge should be disseminated so that physical educators will have an authentic source for health information. Commercial advertising, quackery, fads inevitably warp the health teaching in many schools. It is essential that the knowledge of public health reach physical educators throughout the country.

Public health officials by actively and wholeheartedly coöperating with the teachers of physical education in local situations can readily gain their help in facilitating the adoption of the program in public health education. We, as physical educators, want to help. We only ask for the opportunity.

Vi Antigen in Carrier Strains of Eberthella Typhosa*

HENRY WELCH, PH.D., AND
FRIEND LEE MICKLE, SC.D., F.A.P.H.A.
Research Bacteriologist; and Director, Bureau of Laboratories, State Department of Health, Hartford, Conn.

VI ANTIGEN was described by Felix and Pitt [1, 2] in 1934. In their first paper these authors showed that while the O inagglutinable typhoid strains were virulent for mice, O agglutinable strains were only partially so. They showed O inagglutinability was not demonstrable in all strains, and was entirely absent in their strain 901. The O inagglutinability described disappeared under the action of various agents. In their second paper [2] the nature of this labile factor was clarified in that a newly described antigen was shown to be responsible for the O inagglutinability and virulence. This antigen, Vi (virulence), was found by agglutination and adsorption tests to be distinct from both the H and O antigens. The existence of this new antigen was confirmed by Kauffman [3] in 1935 who demonstrated further that the Vi agglutinogen was far more thermolabile than the H, being completely destroyed in 1 hour at 60° C. Vi agglutinogen resists formalin and therefore Vi immune serum can be prepared with either living or formolized bacilli. However, antiserum prepared with living antigens usually results in higher titers. Felix and his collaborators have shown that the Vi antibody is of primary importance in the defense against attack by virulent strains of *Eberthella typhosa*. Bhartnagar [4] in 1935 showed that inagglutinable strains rich in Vi antigen were highly resistant to phagocytosis, while agglutinable strains devoid of Vi antigen were highly susceptible. Later investigations by Felix and Bhartnagar [5] demonstrated that Vi immune serum produced by injections of living virulent strains of *E. typhosa* exerted a powerful phagocytosis-promoting action on strains containing Vi antigen while it was without any effect on strains devoid of this antigen. Furthermore, Vi immune serum excelled the O immune serum in its phagocytosis-promoting function as it did in the protective action against attack by strains of high virulence. These authors emphasized the necessity of using Vi antigen from living organisms for the preparation of therapeutic antityphoid serum of high potency. Felix and Pitt [6] later showed that rough variants derived from strains of *E. typhosa* which possessed the Vi antigen may still contain the Vi antigen even though the smooth O antigen has been entirely lost. This was confirmed by Kauffman.[3] These variants although non-virulent were still capable of producing both active and

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 21, 1936.

passive immunity. Felix and Pitt[6] suggest that the virulence of the typhoid strains depends on the combined activity of the smooth O and Vi antigen although the Vi antibody alone is sufficient to protect against infection with highly virulent strains. They suggest further the possibility of the use of avirulent, rough, but Vi-containing variants in the preparation of vaccine and therapeutic antiserum.

EXPERIMENTAL

On the assumption that Vi antigen determines the virulence of smooth typhoid strains a study was made of 39 such strains isolated from carriers to determine whether it would be possible to group these carriers on the basis of their ability to disseminate the disease. Preliminary work was done on carrier strains which had been maintained in the laboratory stock collection over a period of from 1 to 5 years. Studies were also made on the preparation of Vi antiserum and on the thermostability of the Vi agglutinogen.

Preparation of Vi Antiserum—Antiserum was prepared with 3 strains known to contain Vi antigen.* Each antiserum was prepared by injecting daily into rabbits increasing amounts of light suspensions of living antigens starting with 0.1 ml. and increasing gradually to 1.5 ml. Fresh antigen suspensions were prepared every 3 days. Ten to 11 daily injections were made in this manner and the animals were bled 2–3 days after the last injection. The Vi titers varied from 1:400 to 1:1,280. The time necessary to develop these antisera was in no case greater than 15 days.

The 3 strains containing Vi antigen were tested to determine the presence of H and O antigenic components. In no instance were we able to demonstrate complete O inagglutinability with these 3 strains. Although the Watson and Ty 2 strains showed very little H agglutinogen the O agglutinogen was readily demonstrated by direct agglutination. The lack of inagglutinability was to be expected because the strains had not been kept on special media but carried on standard nutrient agar, pH 7.4. Hence the serum produced with these strains contained both H and O agglutinins and it was necessary to adsorb all the antisera used in the experimental work with strain H901 which removed the H and O agglutinins but left Vi agglutinins intact. The Vi serum titers (1:400 to 1:1,280) were obtained after adsorption with strain H901.

In checking old carrier strains for Vi antigen 2 antisera, Watson and Rawlins, were used. After adsorption with strain H901, each of the carrier strains was tested in the adsorbed serum using (1) unheated antigen, and (2) antigen heated for 1 hour at 70° C. The results obtained are shown in Table I. The results indicate that Vi antigen may be demonstrated in strains at least 5 years old even when these strains have been carried on standard agar. They also demonstrate that heating these strains at 70° C. for 1 hour destroys the agglutinability of the strains in Vi antiserum. It was possible to confirm the results obtained on 5 strains with Watson Vi antiserum sent to us by Dr. Felix and adsorbed with H901 by him (Table I).

It will be noted by referring to Table I that the Bush strain agglutinated in the Rawlins antiserum but failed to agglutinate in the Watson antiserum. The reverse of this was true with the Scha strain. Because the work with the Rawlins antiserum had been done

* Dr. A. Felix of the Lister Institute kindly sent us two of these strains, Ty 2 and Watson. A third strain, Rawlins, was obtained through the courtesy of Dr. Donald T. Fraser of the Connaught Laboratories, Toronto, Ont. For use later as controls, antisera were prepared with strains H901 and O901 also sent to us by Dr. Fraser.

TABLE I

Vi Antigen in Carrier Strains Tested with Pure Vi Antisera

Carrier Strain Antigens	Rawlins Antiserum † Tested With: Antigen Unheated	Rawlins Antiserum † Tested With: Antigen Heated at 70° C. for 1 hr.	Watson Antiserum † Tested With: Antigen Unheated	Watson Antiserum † Tested With: Antigen Heated at 70° C. for 1 hr.
H 901	0		0	
O 901	0		0	
Watson			1:1,280	0
Rawlins	1:640*	0		
Ferg	1:40	0	1:80	0
Gril	1:160	0	1:1,280	0
Ross	1:80	0	1:640	0
Schaef	1:80	0	1:1,280	0
John	1:160	0	1:1,280	0
Smi	1:40	0	1:640	0
Bul	1:80	0	1:640	0
Hog	1:80	0	1:640	0
Red	1:80	0	1:80	0
Bush	1:40	0	0	0
Haub ‡	1:40	0	1:160	0
Fist	1:80	0	1:160	0
Burk	1:320	0	1:1,280	0
Mus	1:80	0	1:320	0
Schae	1:80	0	1:160	0
Mer	1:80	0	1:160	0
Cor	1:80	0	1:640	0
Gram	1:40	0	1:40	0
Gauth	1:40	0	1:320	0
Scha	0	0	1:80	0
Bed	1:40	0	1:320	0
Vin	1:40	0	1:320	0
Kep	1:40	0	1:160	0
Lab	1:320	0	1:640	0
Grim	1:80	0	1:320	0
Cash ‡	1:640	0	1:640	0
Bang	1:20	0	1:160	0
Lit	1:160	0	1:320	0
Cor	1:160	0	1:1,280	0
Rich	1:20	0	1:160	0
Thom	1:80	0	1:160	0
Kirip	1:160	0	1:320	0
Schae	1:320	0	1:1,280	0
Crez	1:80	0	1:320	0
Fer	1:40	0	1:640	0
Koe	1:40	0	1:160	0
Car	1:160	0	1:320	0
Bab	1:80	0	1:80	0
Cas	1:320	0	1:640	0

* Dilution in each instance represents at least ++ agglutination.

† Pure Vi antiserum was obtained by adsorption with H 901.

‡ The Cash and Haub strains were tested with a pure Vi antiserum (Watson) sent to us by Dr. A. Felix. Both these organisms agglutinated in this serum to 1:400 (++++). Three other strains Capp, N.Y.C., and Gall, not included in table, were also checked with this serum with similar results.

several weeks prior to that with the Watson antiserum and since the strains studied had been developed from single colonies it seemed possible that the variation in Vi content might depend on the colony chosen. Accordingly, 37 of the strains shown in Table I, and 5 carrier strains freshly isolated were studied to determine whether colonies might vary in their Vi content.

Method—Each of the 42 strains studied was inoculated into broth. Within 20 hours these broth cultures were streaked on a single eosin-methylene-blue agar plate. After a 24 hour growth period approximately 9 colonies were transferred from each plate to agar slants at pH 7.4 and incubated 24 hours. Antigens were made by emulsifying the growth in salt solution. Each antigen was divided into two portions and one portion heated for 1 hour at 70° C. Both heated and unheated antigens were tested for Vi agglutinogen in a pure Vi serum. A total of 347 colonies were examined in this manner.

The results obtained indicate a variation in the Vi content of colonies picked from a single strain and that individual colonies may or may not show the presence of Vi antigen. It will be noted that 18.5 per cent of the 347 colonies studied showed no Vi antigen, while 81.5 per cent of the colonies picked from the same plates showed Vi antigen. Although 37 of the strains studied had been carried in stock from 1 to 5 years similar results were obtained with 5 strains recently isolated from carriers. Three of these strains were obtained from Ross L. Laybourn of Topeka, Kans., who informed us that the specimens from which the strains were isolated had been collected in 0.5 per cent lithium chloride.

Vi Antibody Produced by Extracts of E. typhosa *—Two extracts were used to develop Vi antibody. These extracts were prepared by heating heavy suspen-

* We are greatly indebted to Elinor V. Smith, Brown University, Providence, R. I., for her coöperation in these studies.

sions of *E. typhosa* for 4 hours at 60° C. The suspensions were then centrifuged and filtered through Berkfeld N candles. One antiserum, 14, was produced by 3 injections of 1 extract into a rabbit. This rabbit was very ill after the first injection. Antiserum 15 was produced by 1 injection of the second extract. This rabbit developed a chronic debility. Antiserum 24 was produced by 2 small injections of the same extract that had been used to produce antiserum 15. This rabbit showed no reaction. Antiserum 17 was produced by the same extract used to produce antisera 15 and 24, but in this instance the extract was boiled for 1 hour before injection. Three injections were given and the rabbit showed no reaction. Adsorbing these antisera with strain H901 completely removed H and O agglutinins. The adsorbed antisera were then tested for Vi antibody with the Ty 2 and Watson strains (Felix). We were able to demonstrate Vi antibody in antisera 14, 17, and 24, but not in antiserum 15. It will be noted above that antiserum 15 was produced by a single injection of the extract that was used in preparing antisera 17 and 24 both of which showed Vi antibody. The lack of Vi antibody in antiserum 15 might have been due to animal variation, but more likely it was caused by injection of an insufficient quantity of antigen. In view of the apparent thermolability of Vi antigen demonstrated *in vitro* it is interesting to note that an extract heated for 4 hours at 60° C. and then boiled 1 hour before injection was capable of producing Vi antibody *in vivo*.

TABLE II

Variation in Vi Antigen Content of Colonies Picked from Carrier Strains

Carrier	Number of Colonies Studied *	Vi Antigen: Colonies Positive †	Vi Antigen: Colonies Negative
Ferg	10	8	2
Gril	10	6	4
Ross	10	10	0
Schaef	9	9	0
John	9	7	2
Smi	9	8	1
Bul	10	10	0
Hog	6	4	2
Red	10	6	4
Bush	6	5	1
Pist	10	8	2
Burk	10	10	0
Mus	6	3	3
Schae	9	8	1
Mer	10	8	2
Cor	10	7	3
Gram	10	8	2
Gauth	10	10	0
Scha	18	12	6
Bed	9	6	3
Vin	6	6	0
Kep	5	5	0
Lab	9	6	3
Grim	10	7	3
Cash	6	3	3
Bang	6	3	3
Lit	8	8	0
Cord	10	10	0
Rich	10	9	1
Kirip	9	9	0
Scha	10	5	5
Crer	10	8	2
Fer	5	5	0
Koe	10	10	0
Car	8	7	1
Bab	8	6	2
Cas	8	8	0
Perf	7	7	0
An	10	7	3

* Studies were made with pure Vi antiserum, titer 1:640. After adsorption with H-901, control agglutination tests against H-901 and O-901 showed complete adsorption.

† In each instance this antigen could not be demonstrated by agglutination tests after it had been heated to 70° C. for 1 hour.

DISCUSSION

Vi antigen was demonstrated in 44 typhoid carrier strains of which 5 were recent isolations. Because of this it was not found possible to separate these carriers into groups depending upon whether or not the strain they carried contained Vi agglutinogen and so to group these carriers on the basis of their ability to disseminate typhoid fever. Special media appear to be unnecessary for the development and demonstration of Vi agglutinogen, since most of the strains studied had been isolated for from 1 to 5 years, and all strains had been carried on standard agar pH 7.4. The observation that colonies from certain strains failed to

show the presence of Vi antigen while other colonies from the same strain contained this antigen made it desirable to determine whether other strains would exhibit this phenomenon.

In a study of 347 colonies from 39 strains 81.5 per cent of the colonies showed Vi antigen, while 18.5 per cent did not. Fourteen of the strains produced no colonies lacking Vi antigen. However, we feel that such colonies were probably present but an insufficient number were chosen to determine their presence. Twenty-five of the strains studied did show colonies which lacked Vi antigen. These results indicate that even though a single colony from a carrier strain fails to show Vi antigen it does not necessarily follow that the carrier of this strain is not a potential source of typhoid fever. It is apparently a matter of chance whether the colony chosen in the isolation of typhoid strains from stool specimens will show Vi antigen. Conversely, it would appear that if a sufficient number of colonies are chosen, Vi antigen will be present in some, and therefore any typhoid strain may be a potential source of Vi antigen. It would seem to us that this has application in the field of vaccine therapy.

Several authors have noted the thermolability of Vi agglutinogen basing their conclusion on the fact that the heating of a culture containing Vi antigen for 1 hour at 70° C. destroys the ability of the culture to agglutinate in a pure Vi serum. However, most of these authors also noted that, although the Vi agglutinogen cannot be demonstrated *in vitro,* the injection of heated antigens into animals does produce Vi agglutinins. The presence of Vi antibody in a serum produced with an extract of the typhoid organism heated for 4 hours at 60° C. in its preparation and then boiled for 1 hour before injection is further evidence of the unusual reaction of Vi agglutinogen toward heat. The authors are in accord with the conclusions of Felix, *et al. (loc cit)* and those of Horgan,[7] that the *in vitro* and *in viivo* activities of an antigen may differ widely and the discrepancies demonstrated be only apparent.

SUMMARY AND CONCLUSION

1. A short method for the preparation of Vi antiserum is reported.

2. It was found impossible to separate carrier strains of *E. Typhosa* into groups depending on the Vi content of the strains and so to group these carriers on the basis of their ability to disseminate typhoid fever.

3. Of 44 carrier strains examined, some of which had been maintained in stock for from 1 to 5 years, all showed Vi agglutinogen.

4. A study of 347 colonies from 39 carrier strains showed 18.5 per cent of the colonies lacking in Vi agglutinogen.

5. This study suggests that Vi is a normal somatic antigen of the typhoid organism and that under the proper conditions it can be demonstrated in all typhoid strains.

NOTE: The authors wish to express their appreciation to Betty Robinton for technical assistance.

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A Modification of Van Giesen's Stain for Negri Bodies

NATHAN NAGLE AND C. L. PFAU
St. Louis Health Division Laboratories, St. Louis, Mo.

THE Williams [1] modification of Van Giesen's stain for the demonstration of Negri bodies in brain tissue has been utilized in this laboratory for several years. This stain gives poor differentiation in certain brain specimens necessitating adjustment of the proportions of the stain for the individual brain tissue. This manipulation of the stain does not always result in a clear-cut differentiation of the Negri bodies. It was found that the pH of the water used as a diluent was a factor influencing the efficiency of the stain.

Buffered solutions were made in accordance with Clark and Lubs' [2] standard mixtures.* A series of waters ranging from pH 6.4 to 8.4 were tested as diluents for Van Giesen's stain. A buffered solution with a pH of 7.4 gave a more uniform staining reaction than any of the other solutions tried.

Seven hundred and seventy-six animal brains were stained with the following formula. Of this number 293 were positive, and all gave a clear-cut differentiation of the Negri bodies.

8 per cent alcoholic solution basic fuchsin	3 drops
Saturated aqueous solution methylene blue	2 drops
Buffered distilled water pH 7.4	30.0 c.c.

The diluted stain is very unstable and should be prepared only as needed. The stock solutions will keep indefinitely.

This stain is used in the usual way. After the impression smears have been fixed with methyl alcohol for 2 minutes and washed with tap water, the stain is added to the slide, heated gently to steaming and allowed to remain for 5 minutes without further application of heat. The smear is then washed with tap water, blotted dry immediately, and examined by the low power objective to locate large pyramidal cells and then by oil immersion objectives. In a large proportion of positive smears the Negri bodies were found with the low power objective and then confirmed with oil immersion.

* Waters with a variation of less than 0.1 pH of the desired was obtainable as tested by potentiometric methods by not adhering to several refinements specified. For instance a phosphate meeting A.C.S. specifications was dried at 110° C. and the recrystallization was omitted; regular distilled water was used as a diluent instead of redistilled water.

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A Study of the Vi Antigenic Fraction of Typhoid Bacilli Isolated from Carriers and Cases, and the Antibody Content of the Serum of These Patients*

LOIS ALMON, PH.D., JANE READ, AND
W. D. STOVALL, M.D., F.A.P.H.A.
State Laboratory of Hygiene, Madison, Wis.

THE present report concerns an extended investigation of typhoid cultures and sera along the lines laid out in an earlier publication (Almon and Stovall).[1] Since the work was begun, a new reagent in the form of a bacteriophage, for determining the presence of the Vi antigen in typhoid cultures has been described by Craigie and Brandon.[3] They report complete correlation between the sensitivity of cultures to this phage and their agglutinability in Vi antiserum. More than 95 per cent of over 300 typhoid cultures which they tested by this means contained the Vi antigen. Since we have found by preliminary investigation [2] that Craigie's bacteriophage is a very sensitive reagent when employed according to his technic, we have used it, in addition to the methods previously employed, in the study of our cultures.

In this study the Vi content of typhoid cultures was determined by tests for sensitivity to Craigie's bacteriophage; agglutinability in pure Vi antiserum; and, in some instances, virulence for mice. An attempt was then made to determine whether any correlation existed between the characteristics of the organisms thus demonstrated and the clinical manifestations of the individuals from whom they had been derived. For the purpose of these comparisons the cases were classified as "mild to moderate" or "severe," and the carriers were listed in a group by themselves. The bases for classification included such considerations as the height and duration of fever, the length of the illness, the presence of diarrhea or delirium, and the occurrence of any complications, such as hemorrhage, perforation, or phlebitis.

The results of the study of the organisms appear in Table I. The methods employed have been described.[2] The degree of agglutination in Vi serum is recorded in addition to the titer because in efforts to repeat results with certain of the cultures it was found that the degree or type of agglutination remained consistent from time to time, whereas the titer varied considerably. The symbols express the following:

+++ complete agglutination in large clumps

++ complete agglutination in small and large clumps

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 21, 1936.

TABLE I

Analysis of Organisms Isolated from Typhoid Cases and Carriers

	Case No.	Cul. No.	Source of Organism	Titer and Degree of Agglutination in Vi Serum †	Reaction to Phage †	No. of Mice Killed *
Severe Cases	10	T 2	Blood	1,280+++	ACC	2
	11	T 5	Blood	2,560++	PC	6
	12	T 18	Blood	1,280+++	PC	3
	13	T 9	Feces	640++	PC	5
	20	T 22	Feces	2,560++	ACC	..
	21	T 23	Feces	1,280±	ACC	..
		T 24	Feces	2,560+++	CC	..
		T 25	Feces	2,560++	ACC	..
		T 26	Feces	1,280±	ACC	..
		T 56	Feces	1,280+	ACC	8
		T 69	Feces	2,560±	CC	..
	28	T 36	Feces	2,560+	ACC	..
	34	T 42	Feces	640+++	ACC	7
		T 45	Feces	2,560±	PC	..
		T 59	Feces	2,560±	ACC	..
		T 67	Feces	2,560±	ACC	..
	46	T 62	Urine	640+	ACC	..
Mild to Moderate Cases	3	T 4	Blood	1,280+++	ACC	7
	4	T 3	Blood	2,560±	PC	4
	6	T 7	Blood	2,560+++	PC	6
	7	T 10	Blood	640+++	PC	6
	18	T 20	Urine	1,280+	ACC	5
	19	T 21	Urine	2,560++	ACC	..
		T 51	Feces	1,280+	ACC	..
	25	T 31	Feces	1,280±	ACC	..
	26	T 32	Feces	2,560+++	ACC	..
		T 33	Feces	2,560++	ACC	..
		T 34	Feces	2,560+	ACC	..
		T 52	Feces	2,560+	ACC	14
	30	T 38	Feces	2,560+++	CC	..
		T 39	Feces	2,560+++	ACC	..
	40	T 50	Blood	640++	CC	16
	43	T 57	Blood	1,280++	ACC	2
		T 63	Feces	1,280+	ACC	..
	45	T 60	Feces	2,560±	ACC	..
		T 61	Blood	2,560±	CC	..
	47	T 64	Blood	1,280+++	ACC	..
		T 65	Blood	320+++	ACC	..
		T 66	Feces	640+++	CC	..
		T 68	Blood	640+++	CC	..
		T 72	Feces	1,280++	ACC	..
		T 74	Feces	1,280+++	CC	..
		T 77	Feces	640+++	ACC	..

* 20 mice were injected with each culture tested.
† See text for explanation of symbols.

TABLE I (Cont.)

Analysis of Organisms Isolated from Typhoid Cases and Carriers

	Case No.	Cul. No.	Source of Organism	Titer and Degree of Agglutination in Vi Serum †	Reaction to Phage †	No. of Mice Killed *
Cases—No History	24	T 30	Feces	2,560+++	ACC	..
	27	T 35	Feces	2,560+	ACC	..
	29	T 37	Feces	2,560±	ACC	..
	32	T 41	Feces	1,280+	ACC	..
	33	T 44	Feces	1,280++	ACC	2
	48	T 70	Blood	2,560+	CC	..
		T 75	Feces	2,560++	ACC	..
	49	T 73	Feces	2,560±	CC	..
Carriers	14	T 6	Feces	640++	PC	9
	15	T 17	Gall bladder	640+++	PC	4
	16	T 8	Feces	640+++	PC	6
	17	T 19	Urine	2,560++	ACC	1
	22	T 27	Feces	1,280+	PC	..
	23	T 28	Feces	1,280±	PC	..
		T 29	Urine	1,280±	PC	..
	31	T 40	Feces	1,280+	ACC	..
	36	T 46	Feces	640±	ACC	..
	37	T 47	Feces	2,560++	PC	..
	38	T 48	Feces	640+++	ACC	17
	39	T 49	Feces	640+++	ACC	16
	41	T 53	Feces	2,560+++	PC	9
	42	T 43	Feces	1,280+	ACC	4
		T 54	Feces	1,280+	ACC	8
		T 55	Wound	640+++	PC	9
	44	T 58	Feces	1,280±	CC	..
	50	T 76	Feces	2,560++	CC	..

* 20 mice were injected with each culture tested.
† See text for explanation of symbols.

+ complete agglutination in small clumps
± definite though incomplete agglutination, usually in small clumps

The symbols in the column reporting the reaction to the bacteriophage refer to the appearance of the area on the plate to which the phage had been added; thus CC means completely clear, ACC almost completely clear, and PC partially clear.

One thing emerges clearly from these results: all of the cultures contain the Vi antigen. In our previous work [1] we failed to obtain this result due to the failure to demonstrate agglutinability in Vi antiserum. But the use of Craigie's bacteriophage and a refinement of our methods for producing Vi antiserum (*i.e.*, using it immediately after absorption instead of allowing it to stand a few days) have shown that the only cultures in our collection which do not contain this antigen are some which have been in stock for more than 5 years, and some recently obtained by us from other laboratories where they had been in stock for a long time. Another conclusion which seems warranted by

TABLE II

Analysis of Antibodies in Blood of Typhoid Patients and Carriers

	Case No.	Time Since Onset of Illness	Vi Antibody Titer	O Antibody Titer	H Antibody Titer
Severe Cases	9	7 days	0	2,560	640
		44 days	0	5,120	1,280
	10	9 days	0	640	320
	11	18 days	0	5,120	1,280
		40 days	0	2,560	640
	12	31 days	0	10,240	2,560
	20	49 days	0	320	80
	*21	7 months	160	1,280	1,280
	*28	6 months	0	640	160
	*34	4 months	160	320	80
	46	14 days	0	320	320
	55	8 months	0	640	1,280
Mild to Moderate Cases	1	22 days	0	1,280	200
		37 days	0	2,560	640
		59 days	0	2,560	1,280
	2	4 days	0	2,560	0
		19 days	0	2,560	0
		41 days	0	2,560	160
	3	6 days	0	2,560	5,120
		21 days	0	5,120	5,120
	5	45 days	40	640	320
	6	8 days	0	1,280	0
		17 days	0	2,560	160
		29 days	0	5,120	320
		1½ years	0	160	160
	7	30 days	1,280	2,560	1,280
		42 days	640	2,560	640
	8	18 days	0	1,280	320
	*18	28 days	0	640	1,280
		42 days	0	640	1,280
		50 days	0	1,280	1,280
		60 days	0	1,280	1,280
	19	20 days	160	10,240	5,120
		68 days	40	320	640
	25	14 days	160	2,560	2,560
		12 days	160	10,240	10,240
	26	4 months	80	160	1,280
	30	43 days	0	2,560	1,280

* Developed carrier state.

TABLE II (Cont.)

Analysis of Antibodies in Blood of Typhoid Patients and Carriers

	Case No.	Time Since Onset of Illness	Vi Antibody Titer	O Antibody Titer	H Antibody Titer
	40	14 days	0	80	0
		15 days	0	320	160
		21 days	0	640	320
		27 days	0	640	160
	43	15 days	0	1,280	640
		27 days	0	1,280	1,280
	47	6 days	0	0	0
		20 days	0	320	0
		31 days	0	2,560	640
	51	75 days	160	80	160
Carriers	15	6 years	40	0	2,560
	17	Not known	0	0	1,280
		Not known	0	640	2,560
	22	28 years	0	2,560	5,120
	23	35 years	0	160	320
	31	No history of typhoid	0	80	80
	36	8 years	0	80	160
	37	4 years	0	160	320
	38	20 years	0	80	160
	39	No history of typhoid	0	40	80
	41	33 years	0	160	320
	42	17 years	80	80	640

the results is that the organisms isolated from any given individual show considerable similarity in their behavior toward the bacteriophage; *e.g.*, all of the 6 cultures isolated from case 21 showed complete or almost complete inhibition by the phage (there is scarcely any difference between the complete and the almost complete action); all of the 4 cultures from case 26 showed almost complete inhibition, and so on for cases 30, 43, 45, 47, and 48. The 2 cultures from case 23 showed partial inhibition by phage. Exceptions occur only in cases 34 and 42 in which instance a partially sensitive culture was obtained in a series of almost completely sensitive ones.

In view of the failure to demonstrate any other quantitative correlations we were surprised, not so much by the occurrence of the exceptions as by the infrequency of their occurrence. No other relationships are apparent. The organisms from severe and mild to moderate cases and carriers showed the same variations in behavior throughout. The data on virulence are especially interesting in this connection. As pointed out,[2] the killing of any mice in a test involving 20 mice, each injected with 100 million organisms of a given culture, indicates nothing except that Vi antigen is present in the culture; no quantitative correlations exist. If the ability to kill 14 or more mice be taken as indication of high virulence in cultures, the evidence indicates complete lack of correlation between degree of virulence for man and degree of virulence for mice, for the only cultures in this class were derived in 2 instances

from mild to moderate cases and in 2 from carriers.

The data on the presence or absence of the Vi antibody in human sera are likewise difficult to interpret. These appear in Table II. The Vi titer of the sera was obtained by absorbing them with culture H 901 and testing for the agglutination of either culture Ty 2 or culture Watson. By these means the antibody was demonstrated in 2 of the 10 severe cases, in 6 of the 16 mild to moderate cases, and in 2 of the 11 carriers of long standing. The earliest appearance of the antibody was on the 20th day of illness, Case No. 19, and the titer was declining by the 68th day. It seems that there is no regularity either in the time of appearance of this antibody, or in the event of its appearance at all, though there is corroboration of the suggestion by Felix, Krikorian, and Reitler [4] to the effect that the Vi antibody develops later than the O and H antibodies.

SUMMARY AND CONCLUSIONS

If it is true, as our results and those of others indicate, that all or nearly all typhoid cases are caused by organisms containing the Vi antigen, and if, none the less, the Vi antibody is formed in these individuals only occasionally and at irregular, unpredictable times and bears no relation to the swiftness of recovery or the development of the carrier state, the rôles of this antigenic fraction and its corresponding antibody in the progress of the infection and recovery are very obscure.

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The King's English

UNDER this title A. H. Little presents in parallel columns selected paragraphs from Edward's renunciation of the throne, and the same ideas as some of the rest of us might have said them. Here is a sample:

You all know the reasons which have impelled me to renounce the throne. But I want you to understand that in making up my mind, I did not forget the country or the Empire which, as Prince of Wales and lately as King, I have for 25 years tried to serve.

You are all apprised of the factors that have prompted me to adjure the highest honor within the gift of the British people. But I desire that there shall be impressed upon you the fact that, in arriving at a decision, I was not unmindful, as it were, of the country or the Empire to which, as Prince of Wales and subsequently as King, I have bent my best efforts to give service.

And, says the author (*Printers Ink*, 185 Madison Ave., New York, N. Y., Dec. 17, 1936)—

In a world gone awry with equivocation, God save to civilization such shining exceptions as this English King who, having laid his kingship aside, talked to his people in language that they could not fail to feel and could not fail to understand.

An International System of Health Indices*

A Preliminary Report

KNUD STOUMAN AND I. S. FALK, PH.D., F.A.P.H.A.

Former member of the Secretariat, Health Section, League of Nations, Geneva; and Formerly Research Associate, Milbank Memorial Fund, New York, N. Y.

IN recent years there have been many important advances in the development of public health statistics. Improvements have been made in many fields—in the measurement of health conditions in a community; in the appraisal of activities undertaken to conserve the health of a population; and in the study of relationships between environmental factors and health. Nevertheless, the need for a more substantial body of statistical information still exists everywhere. The means to this end must be adapted to the conditions which prevail in different countries.

The Health Organization of the League of Nations has been interested from its inception in the development of public health statistics, and has made some important contributions in this field. Recently, the Organization has attempted to formulate a systematic plan upon which further undertakings might be based. About two years ago, Dr. Ludwig Rajchman, Medical Director of the Health Section of the League, conceived the idea of developing an international system of health indices. After a number of preliminary explorations, a program of study was planned and carried out in Geneva and in the United States as a joint undertaking by the Health Organization of the League and the Milbank Memorial Fund.†

The basic questions of our inquiry may be stated in the following words: What information is needed to evaluate the state of the public health and the factors which affect it? How can this information be arranged in a logical and concise form?

Health indices are neither new nor novel to health authorities. Many such indices have long been in use and, in greater or lesser measure, are routinely collected and published. These may be illustrated by: death rates, crude or specific in respect to sex, age, cause, occupation or place; morbidity rates for

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† The studies in America have been carried on principally at the Department of Public Health, Yale School of Medicine, New Haven, Conn. The authors are greatly indebted to Professor C.-E. A. Winslow, Professor Ira V. Hiscock, Dr. J. H. Watkins, and to others at Yale, and to Dr. J. I. Linde, Commissioner of Health of New Haven. They are also indebted to Dr. W. F. Walker of the Commonwealth Fund and to Dr. George T. Palmer of the New York City Department of Health.

reportable disease; fatality rates; services rendered per reported case or per registered death from a particular disease. The objective of our study is a broader and more systematic arrangement of such data as are available or of such as it is desired should become available for the use of health authorities.

Much of the information which may be required by a system of health indices is not now available in any particular locality. Much which is now available is seriously lacking in international, or frequently even in intra-national, comparability. However, comparability of statistics—like completeness of statistics—has rarely been attained before there was demand for it. A system of health indices may help to create a stimulus for the improvement of public health statistics by including imperfect data and by using them for what they are worth. The recognized imperfections will provide a constant stimulus for the development of comparability through international definitions and standards on subjects which profit from standardization.

A system of health indices must cover a very wide field if it is to furnish precise and objective information on the state of the public health. The system cannot be properly limited to activities for which only the official health department is responsible. On the contrary, it must take account of all important factors which are concerned with the health of the individual, of the group, and of the community. It is a secondary and not a primary issue whether one agency of government or another, whether an official or an unofficial agency, whether a group or an individual, is principally concerned with a particular aspect of the problem or with a specific form of service. The objective is a systematic survey of the health of a people, not the anatomy of existing functional arrangements for health services.

The term *health indices* has been chosen deliberately. It implies a reasoned selection, from the unwieldy mass of public health statistics, of such elements as are most characteristic and descriptive of a given situation.

THE PROPOSED SYSTEM

The proposed system of health indices has 3 main divisions:

A. Vitality and Health
B. Environment
C. Administrative Activity

These 3 main topics have been subdivided to include altogether 44 subtopics. These in turn include about 500 indices with many subdivisions.

Application of the full system of indices to a community requires a detailed study. If the indices are accompanied by an explanatory text, they yield a comprehensive health survey. Thus, the *detailed list* of health indices becomes in effect a survey schedule for the community wishing to make a thorough local study. Its length and detail militate against its use in communities interested in less intensive studies or in brief periodic surveys. The *detailed list* of health indices has therefore been supplemented by an *abridged list* which covers all subjects but includes only about one-fifth of the indices. This *abridged list* is sufficiently subdivided to serve as a survey schedule and yet is brief enough so that its use should not require specially trained personnel or extensive research. Finally, even the *abridged list* has been further condensed into a *short list* of about 75 simple indices which can be compiled without very much labor. This *short list* is sufficient to yield an aeroplane view over the entire field of health interest.

Chart I shows the subjects included in the system of health indices. A few

CHART I

A SUMMARY OF THE SUBJECTS INCLUDED IN THE SYSTEM OF HEALTH INDICES

Subject

A. Indices of Vitality and Health

I. Population
II. Natality
III. Stillbirths, Infant and Maternal Mortality
IV. General Mortality and Causes of Death
V. Morbidity
VI. Invalidity
VII. Insanity and Mental Defects
VIII. Alcoholism and Drug Habit
IX. Accidents
X. Suicides and Homicides
XI. Examinations of Physical Fitness

B. Indices of Environment

I. Climate
II. Topography and Density of Population
III. Occupation
IV. Distribution of Wealth
V. Cultural Level
VI. Illegitimacy and Prostitution
VII. Housing
VIII. Nutrition
IX. Consumption of Alcoholic Beverages, etc.

Subject

C. Indices of Administrative Activity

I. Community Expenditures on Sickness and Public Health
II. Sanitary Personnel
III. Vital Statistics
IV. Laboratory Services
V. Acute Communicable Diseases
VI. Venereal Diseases
VII. Tuberculosis
VIII. Other Diseases
IX. General Public Health Nursing
X. Maternity Hygiene
XI. Infant and Preschool Hygiene
XII. School Hygiene
XIII. Physical Education (Outside of Schools)
XIV. General Sanitation
XV. Food Inspection and Nutrition
XVI. Housing
XVII. Industrial Hygiene
XVIII. Health Instruction
XIX. Care of the Insane and Feebleminded
XX. Hospital Facilities
XXI. Health Insurance
XXII. Free Medical Assistance
XXIII. Invalidity Care
XXIV. Care of the Aged

of the less important subjects are omitted (*i.e.*, are not represented by indices) in the *short list*.

It is difficult to show in a short space the actual composition of the detailed health indices. It is expected that complete reports will be published soon.[1] To illustrate the contents of a series of health indices, the tentative *short list* is shown in Chart II.

USE OF THE HEALTH INDICES

In their present form, the health indices are designed for use in local areas. They can be arranged for special application to urban or to rural areas. They may be applied to districts larger than local communities or to part or all of an entire country. The indices have been compiled so that they shall be applicable to widely different parts of the world. Consequently, some of the indices are not pertinent to particular communities. This is not a serious deficiency. The selected lists which we have prepared have no special significance at this time beyond the demonstration that such lists can be prepared. Longer or shorter lists of health indices can be arranged to meet the special needs of one country or another. Particular indices may be added or subtracted. Further study and actual experience should, however, lead to agreement upon a basic list of indices which may be used more or less uniformly in many areas (perhaps in all areas). Such a basic list can be supplemented by other indices appropriate to special needs and circumstances. The indices are simple and their compilation or selection is flexible.

During the course of this study, the system of health indices has been tested by application to the city of New

CHART II

THE SHORT LIST OF HEALTH INDICES

(A Tentative Selection Arranged for a City and Its Suburban Area)

Year:

A. Indices of Vitality and Health

1. Population:
   a. City
   b. Suburban area
2. Annual rate of growth:
   a. City
   b. Suburban area
3. Percentage of children and aged persons:
   a. Under 15
   b. 65 and over
4. Nativity and race:
   a. Native white, native parentage
   b. Native white, foreign or mixed parentage
   c. Foreign born white
   d. Colored
5. Live births per 1,000 women, 15–44
6. Percentage of illegitimate births
7. General death rate
8. Neonatal mortality (under 1 month) per 1,000 live births
9. Later infant mortality (1–12 months) per 1,000 live births
10. Maternal mortality (including abortions) per 1,000 total births
11. Death rate under 1 year from diarrhea per 1,000 live births
12. Death rate from certain causes per 100,000 population:
    a. Tuberculosis (all forms)
    b. Influenza and pneumonia
    c. Cancer
    d. Heart disease
    e. Suicide
13. Notified cases per 100,000 population:
    a. Typhoid and paratyphoid fevers
    b. Diphtheria
    c. Scarlet fever
14. Cases of venereal diseases registered per 10,000 inhabitants
15. Diagnosed tuberculosis cases (all forms) on active file per 10,000 inhabitants
16. New tuberculosis cases (all forms) reported per 100 cases on register
17. Death rate from tuberculosis (all forms) of cases having been on the register for more than 6 months per 1,000 of such cases
18. Percentage of school children examined found to be without physical defect
19. Defects found at school medical examinations per 1,000 children examined:
    a. Heart disease
    b. Malnutrition
    c. Pediculosis
20. Days of sickness of public school children per 1,000 pupil days due to:
    a. Epidemic diseases
    b. Colds
    c. Throat and tonsils
21. Blind persons per 10,000 population
22. Persons killed in automobile accidents per 100,000 population:
    a. City
    b. Remainder of county
23. Persons injured in automobile accidents per 100,000 population:
    a. City
    b. Remainder of county
24. Persons injured in automobile accidents per 1,000 registrations:
    a. City
    b. Remainder of county

B. Indices of Environment

25. Mean monthly temperature:
    a. Highest
    b. Lowest
26. Hours of sunshine in percentage of possible maximum
27. Density of population per square mile:
    a. City
    b. Suburban area
28. Proportion of metropolitan population living in city
29. Percentage of population 15 years and over engaged in gainful occupation:
    a. Males
    b. Females
30. Percentage of families in which wife was gainfully employed
31. Percentage of children of 14 and 15 gainfully employed
32. Percentage of occupied male population engaged in industry
33. Domestic servants per 1,000 population
34. Percentage of illiteracy over 10 years of age:

NOTE: When an index applies to a prior year or to a period of years, specify the period

CHART II (Cont.)

THE SHORT LIST OF HEALTH INDICES

(A Tentative Selection Arranged for a City and Its Suburban Area)

a. Native white
b. Foreign born white
c. Negro

35. Primary school attendance (7–13 years inclusive)
36. Higher school attendance:
a. 14 and 15 years
b. 16 and 17 years
c. 18 to 20 years, inclusive
37. Percentage of homes inhabited by owner
38. Distribution of rented homes according to rent:
a. Under $30 per month
b. $30 to $49 per month
c. $50 and over per month
39. Telephones per 100 inhabitants
40. Automobiles registered per 100 inhabitants
41. Percentage of wage-earners unemployed:
a. Males
b. Females
42. Percentage of families living in one-family houses
43. Number of rooms per apartment in tenement houses
44. Percentage of population which is lodged with less than 1,000 cubic feet of air per person
45. Percentage of homes not provided with bathroom
46. Annual consumption of fluid milk and cream per capita

C. Indices of Public Health Activities

47. Physicians per 10,000 inhabitants
48. Public health nurses per 10,000 inhabitants
49. Health Department budget per capita
50. Other public and voluntary agency expenditure on public health per capita
51. Percentage of deaths from unknown or ill-defined causes
52. Typhoid examinations per case notified
53. Syphilis tests per case notified
54. Milk and cream examinations per 1,000 quarts consumed
55. Bacterial examinations of public water supply per week
56. Number of cases notified per death:
a. Typhoid fever
b. Diphtheria
c. Scarlet fever
57. Cases of measles found by health department personnel per case reported by physicians
58. Visits of nurses and other health department personnel per case of:
a. Scarlet fever
b. Measles
c. Whooping cough
59. Percentage of children who are immunized against diphtheria:
a. Under 5 years
b. 5–14 years
60. Venereal disease cases on register for each new case notified
61. Visits to clinic or physician per registered venereal disease patient
62. Percentage of tuberculosis deaths which were not found on register
63. Tuberculosis clinic visits per death
64. Nursing visits per diagnosed tuberculosis case
65. Contacts on active file in tuberculosis clinics per diagnosed case
66. Patient days in tuberculosis institutions per death
67. Expectant mothers receiving prenatal care per 100 confinements
68. Percentage of maternity cases delivered in hospital
69. Percentage of maternity cases receiving postpartum nursing care
70. Visits to infant clinics per 100 live births
71. Nursing visits to infants per 100 live births
72. Percentage of school children who received a medical examination
73. Percentage of dwellings connected with public water supply
74. Percentage of dwellings connected with street sewers
75. Percentage of milk pasteurized
76. Inspections per dairy
77. Inspections per public eating place
78. General hospital beds per 1,000 inhabitants

NOTE: When an index applies to a prior year or to a period of years, specify the period

Haven, Conn. The *detailed list* has been used as far as available information permitted and a text has been written to accompany the statistical indices. Text and indices combined constitute a health survey of the community. The *short list* modified to suit local conditions has also been compiled for New Haven and it can stand by itself as a statistical abstract or preview of the more detailed survey.*

The validity of the *short list* of health indices deserves further comment. This list is admittedly the result of personal selection and is therefore open to the weaknesses inherent in this technic. However, it should not be difficult to correct errors of judgment which will be revealed by practical experience with the selections which have been made. If particular indices are vague or are not incisive, they can be sharpened. If too many indices have been included on one subject or too few on another, these errors of judgment can be easily corrected by subtracting here or adding there.

The *short list* of about 75 indices could be further condensed without sacrificing any fundamental value in giving an insight into health conditions in an area. (Dr. P. S. Platt showed in 1928 that the administrative activities of 46 cities which had been appraised could be "scored" almost as accurately with 11 appropriately selected criteria or indices as with the 131 then contained in the *Appraisal Form for City Health Work*.[2] A brief list, containing between 30 and 50 indices, might be devised for frequent surveys to measure change or progress in a community. Such a brief list could perhaps be collected and published routinely for many areas by the responsible regional or national health authorities. There would be no "scores," and there would be indices of end results (*i.e.*, death rates, sickness rates, etc.) as well as indices of administrative activity. Hence, even a very brief list would not invite emphasis upon "activities" at the expense of balance and accomplishment in the public health program of a community.

* The results of this experimental application of the health indices to the City of New Haven has been published with the complete report on the system of health indices. (See Ref. No. 1.)

COMPARISON OF INDICES AND THE APPRAISAL FORMS

The system of health indices outlined here will not seem novel to American health administrators who have had nearly 15 years' experience with the *Appraisal Forms* developed by the Committee on Administrative Practice of this Association. There are important points of similarity and also of difference between the system of health indices and the *Appraisal Forms*.

The *Appraisal Forms* use a series of health indices (called criteria) to measure administrative activities. In this respect our proposal follows the technic of the *Appraisal Forms*. There are, however, differences of two kinds between the system of health indices and the *Appraisal Forms*. The first is in respect to scope and content. The *Appraisal Forms* have been restricted to administrative activities; only meager attention is given to the composition of the survey area and almost none to its social, economic, or cultural environments. Contrariwise, the health indices are intended to cover any subject which has (or is reasonably presumed to have) a significant bearing upon health. The second difference appears in respect to technic. The *Appraisal Forms* use 4 types of data: *criteria* (or indices), *standards, scores,* and *relative values;* the health indices use only one, the *indices* themselves. By omitting standards, scores, and relative values, the

health indices gain in flexibility and in breadth of application to counterbalance what they lose in quantitative judgment and definitive appraisal.

So far as the United States is concerned, the system of health indices cannot be viewed as a substitute for the *Appraisal Forms*. The health indices are intended to measure the state of the public health. They are not designed to show precisely which administrative activities are strong or weak. This is a function of the *Appraisal Forms*. If they can be sufficiently perfected, the health indices may serve areas which are not (and cannot be) reached by the technic of the *Appraisal Forms*. This is perhaps particularly true of small towns, rural areas, and communities without organized public health agencies. Yet, if applied to a sufficient number of areas, the health indices can serve for the accumulation of data from which *Appraisal Form* standards can be developed upon many subjects which have hitherto been without quantitative evaluation.

The system of health indices begins by measuring health conditions, health problems, and service needs in a community. The system should therefore encourage local authorities to think in terms of local needs, not in terms of any standard pattern of health work. This point has appealed to the Study Group of the Sub-Committee on the Revision of the Rural Appraisal Form. The Sub-Committee is also concerned with the need to broaden the purview of public health practice. It is therefore now studying the advisability of substituting a scheme of health indices for the miscellaneous items of information hitherto used in the introductory sections of the rural *Appraisal Form*. Thus, we would repeat that health indices would be used not as a substitute for, but as a complement to, the *Appraisal Forms*.

PLAN IS EXPERIMENTAL

The outline of a system of health indices is submitted with full recognition that many difficulties are involved in its use. There is no precedent to follow except in the narrower field of administrative practice. The proposed plan must therefore be regarded as experimental. The arrangement of many items will undoubtedly be found unsatisfactory and will have to be improved, but the experimental stage cannot be hurdled. The concept of the proposed system is brought before the American Public Health Association at this time with the hope that it will be used experimentally—perhaps at the outset in urban areas—and that it will be found worthy of constructive criticism.

What results may be expected from the application of the proposed system of health indices?

1. The scheme of health indices lends itself to systematic survey and exploration of the field of health statistics.

2. The development of an international system may provide a new stimulus to improve the completeness of existing data and to extend national and international comparability in existing and in new health statistics.

3. The *detailed list* of health indices and the schedule forms which have been devised may be used for the purpose of making local and regional surveys. Such undertakings would lead to the preparation of comprehensive reports. These would cover description of the community and its population; the health status of the people; the description and measurement of local health problems; an inventory of the personnel and facilities available for health purposes and health services; and a compendium of health services furnished by official and nonofficial agencies. Publications representing the results of such surveys in a number of communities will have many common characteristics, and the data which are accumulated should have important elements of comparability.

4. The *abridged list* of health indices lends itself to less intensive surveys than can be made with the detailed list. Such surveys can avoid the need for specially trained sur-

vey personnel or for extensive statistical investigations.

5. The *short list* of health indices may be found useful in the performance of frequent surveys. The discovery of strength or weakness in health conditions may be rapidly expedited by its use.

6. Even the *short list* can be further condensed into a brief series of health indices. This may be useful for the routine collection of data essential to an understanding of health conditions, health services, and health needs in a wide variety of communities. Regional and national health authorities may be able to use such selected health indices for the routine supervision of local conditions.

The system of health indices is proposed as an instrument which may be applied to serve many purposes in the detailed or in the periodic assessment of health conditions. The system may lend itself especially to the study of change or progress in health needs and activities.

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Cancer Council

A RECENT development of considerable importance in the cancer field was the formation at the suggestion of the National Association of Science Writers of the Cancer Council to act as a clearing house for information and an integrating force in education, therapy, and research.

Members of the Council and the organizations which they represent are: Dr. Frank E. Adair, Memorial Hospital, for the American College of Surgeons; Dr. James B. Murphy, Rockefeller Institute for Medical Research, and Dr. C. C. Little,† Roscoe B. Jackson Memorial Laboratory, for the American Association for Cancer Research; Dr. Karl Kornblum, Graduate Hospital, University of Pennsylvania, for the American Roentgen Ray Society; Dr. Burton T. Simpson,† State Institute for the Study of Malignant Disease, Buffalo, and Dr. James Ewing, Memorial Hospital, for the American Society for the Control of Cancer.

The first meeting of the Council on March 5 was followed by a dinner at which questions submitted by the National Association of Science Writers, a group of newspaper men writing on scientific subjects for daily papers, were discussed and answered. The questions dealt with steps being taken by the medical profession to educate its own members, with research, with diagnosis, the value of X-rays in discovery of the disease, and the possible importance of diet as a cause of cancer. Most significant was the discovery that the newspaper men and the public through them did not realize that the financial resources for cancer research were painfully inadequate. The Council declared, also, that cancer was the greatest public health problem of the day and that "All public health departments should be actively interested in advancing cancer education and encouraging the extension of cancer diagnostic facilities under proper medical auspices."

† Member A.P.H.A.

Reaction of Young Adults to Alum-Precipitated Diphtheria Toxoid*

RUTH E. BOYNTON, M.D., AND RALPH V. ELLIS, M.D.
Director, Students' Health Service, Associate Professor of Preventive Medicine and Public Health; and Physician, Students' Health Service, Assistant Professor of Preventive Medicine and Public Health, University of Minnesota, Minneapolis, Minn.

OWING to the low risk of attack and the relative mildness of diphtheria in young adults, there is considerable difference of opinion as to the advisability of artificial immunization in this age group. The question is of considerable practical importance as it applies to schools, colleges, and institutions. Obviously a dogmatic answer cannot be given on the basis of present information. Many considerations must enter into the judgment, but perhaps the most important are the local risk of exposure to natural infection, the degree of group susceptibility as measured by the Schick reaction, and the method of immunization which is used, with particular reference to its simplicity of application, its effectiveness, and its freedom from untoward results. In regard to the last mentioned consideration the use of a single dose of alum-precipitated toxoid as an immunizing agent has had extensive trial in infants and children, and many reports are available in the literature.[1-5] Observations on its use in young adults are much more limited. Report is therefore being made of the experience of the Students' Health Service at the University of Minnesota in immunizing 1,900 young men and women by this procedure.

The material which has been collected will be considered under 4 headings: (1) the immunization status of this group of young adults in Minnesota in the year 1935, (2) local and general reactions following the injection of a dose of alum-precipitated toxoid, (3) the dependability and significance of skin sensitiveness to toxoid (Moloney Test) [6] as a pre-immunization guide to the likelihood of a reaction,[7, 8] and (4) the immunizing value of 1 dose of alum-precipitated toxoid in this group of young adults as measured by a Schick reaction done 2 to 4 months later.

METHOD OF STUDY

In the fall of 1935, as a part of the entrance physical examination, a Schick test was performed routinely on each student. At the same time on the opposite forearm 0.1 c.c. of a 1 to 20 dilution of toxoid was injected intradermally according to the technic of Moloney and Fraser.[6, 7] The Schick material was commercially prepared by a single phar-

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 22, 1936.

FIGURE I

You recently received an injection of diphtheria toxoid at the Health Service, the purpose of which was to protect you against diphtheria. Usually this injection causes no unpleasant effects, but occasionally it may cause some slight discomfort. In order to make our information more complete, will you please supply the information requested below?

1. I noticed no ill effect.
2. I noticed those effects checked below:

(a)—Arm

Soreness____ Slight____ Moderate____ Severe____
Redness____ Slight____ Moderate____ Severe____
Swelling____

(b)—Generalized symptoms

Headache _____ hours after injection which lasted_____
Backache
Chilliness
Fever____ Did you use a thermometer? If so, what was your reading?_____
General aching

Return to Students' Health Service through the University Mail

maceutical house, but it was not known whether all came from one batch of toxin. The diluted toxoid used for the reaction test was prepared from a single batch of commercially produced plain diphtheria toxoid. The original batch of toxin was not identical with that used for the alum-precipitated toxoid later used for immunization.*

The reaction about both points of injection was read in 48 hours and again at the end of 7 days. All of the readings were made by two individuals. All students showing a positive Schick test were advised to have an injection of alum-precipitated toxoid which was administered in a dose of 0.5 c.c. at the time of the last Schick reading and irrespective of the skin sensitiveness to toxoid.

Two weeks later each student who had received an injection of alum-precipitated toxoid was given a card asking specific questions about reactions, either local or general, which had occurred. Of the 1,900 students immunized, 1,336, or 70 per cent, responded with reports. Those who had had symptoms severe enough to be incapacitated had already reported to the Health Service dispensary for advice and care.

COPY OF RECORD

From 2 to 4 months later the 1,900 students immunized were notified to report for another Schick test to determine their immunity status.

Immunity Status as Determined by Schick Reaction—Students at the university come from all parts of the state. The group studied may therefore be considered as representing a fair sample of this population living under both urban and rural conditions. The diphtheria death rate has been falling steadily, and during 1934 reached an all time low of 0.61 per 100,000 population in the state as a whole.

DIPHTHERIA MORTALITY IN MINNESOTA 1910–1935

Of the group of 3,205 college students

* The term "Moloney test" will be used in this paper to denote the skin test reaction here defined.

TABLE I

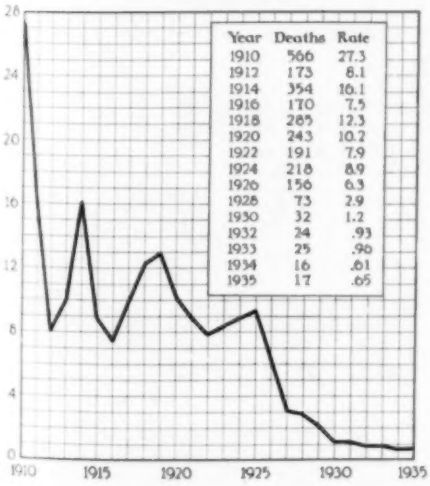
Positive Schick Test

	No History of Previous Artificial Immunization		*History of Previous Artificial Immunization*		*Total*	
	No. Tested	*Per Cent Positive*	*No. Tested*	*Per Cent Positive*	*No. Tested*	*Per Cent Positive*
Male	1,400	78.8	853	57.3	2,253	70.7
Female	574	79.2	378	52.6	952	68.7
Total	1,974	79.0	1,231	55.9	3,205	70.1

on whom the Schick test was performed during the routine examinations 70.1 per cent were positive. Of this number 1,231, or 38.2 per cent, gave a history of having been artificially immunized against diphtheria at some time during their previous life. In our experience, a history of immunization procedures which may have been done during childhood is very unreliable. The material used for this immunization and the time at which it had been given could not be accurately ascertained. It is quite questionable whether 38.2 per cent had actually received diphtheria immunization.

If those who gave a history of previous artificial immunization are eliminated from consideration, of the remaining 1,974 students, 79 per cent showed a positive reaction. In other words, only 21 per cent had become immune through natural exposure. This figure is lower than those obtained by other observers upon comparable groups in other parts of the United States. It would seem to reflect a very low natural exposure rate at this time in Minnesota. Furthermore it is notable that among those who gave a history of previous artificial immunization 56 per cent were still Schick positive.

FIGURE II



Local and General Reactions Following One Dose of Alum-Precipitated Toxoid—Of 1,900 students who were given a 0.5 c.c. dose of alum-precipitated toxoid, only 34 subsequently reported because of severe reactions. Of these, only 5, or 0.26 per cent, had severe enough reactions, either local or general, to be hospitalized. Five others developed sterile abscesses at the site of injection. In 2 the abscesses opened spontaneously, the other 3 were incised. In each case, as soon as the abscess had been opened and drained, healing took place quickly and in no instance was it necessary to have a dressing applied more than 4 days.

Two weeks after being inoculated, a questionnaire was sent to each student asking for a report on subjective symptoms thought to be due to the toxoid. Of the 1,336 reporting, 20.8 per cent stated they had no ill effect. The remaining 79.2 per cent reported

TABLE II

Reactions to Alum-Precipitated Toxoid

	Number	Per Cent
Total number immunized	1,900	100.0
Number reporting to dispensary because of reactions	34	1.7
Number hospitalized because of reactions	5	0.26
Number of sterile abscesses	5	0.26
Number answering questionnaire regarding reactions	1,336	70.3
Reporting no ill effect	279	20.8
Reporting either local or general reactions or both	1,057	79.2

either local or general reactions of varying severity as indicated in Table II.

The reason some individuals have local or general reactions following the injection and others have no ill effects, is not entirely clear It has been generally assumed that the two most important causes are: (1) specific sensitization to some protein in the toxoid preparation, or (2) a general allergic state of the individual. In Table III the subjective symptoms following alum-precipitated toxoid are presented in relation to the allergic history of the individual. A positive allergic history here indicates either a history of allergy in the family, or in the individual, or both.

Although the percentage of local and general reactions is slightly greater in the group giving a history of allergy as compared with the group which did not, the differences are not great enough to be statistically significant. It is inferred, therefore, that the constitutional factor as indicated by such a history is relatively unimportant in relation to the occurrence of a reaction following the immunizing procedure.

Table IV presents the reactions following alum-precipitated toxoid correlated with the interpretation of the pre-immunization Moloney test.

Of those showing positive Moloney tests, 10.4 per cent subsequently reported that they had no ill effects from the alum-precipitated toxoid as compared with 22.3 per cent of those with negative Moloney tests. Local reactions such as soreness, redness, or swelling of the arm with or without constitutional reactions, such as headache, backache, chilliness and fever, were reported more frequently in the group with positive than in the group with negative tests.

In other words, the test was of some value in indicating those who were

TABLE III

Reaction to Alum Precipitated Toxoid According to Allergic History

	Positive Allergic History			*Negative Allergic History*				
	No.	*Per Cent*	*P.E.*	*No.*	*Per Cent*	*P.E.*	*Difference*	*Difference / P.E. Dif.*
Total number	583			684				
No ill effect	113	19.4	±1.1	149	21.8	±1.1	+2.4±1.51	1.6
Local Reactions:								
Severe soreness	70	12.0	±0.9	59	8.6	±0.7	—3.4±1.14	3.0
Severe redness	36	6.3	±0.7	29	4.2	±0.5	—2.1±0.81	2.6
Swelling	247	42.4	±1.3	280	40.9	±1.3	—1.5±1.85	0.8
General Reactions:								
Headache	55	9.4	±0.8	55	8.0	±0.7	—1.4±1.04	1.3
Fever	38	6.5	±0.7	42	6.1	±0.6	—0.4±0.94	0.4
General aching	48	8.2	±0.7	44	6.4	±0.6	—1.8±0.94	1.9

TABLE IV

Reactions to Alum Precipitated Toxoid

Correlated with Skin Sensitiveness to Toxoid as Shown by Pre-immunization Moloney Test

Subjective Symptoms Reported by Students

	Moloney Test +		*Moloney Test —*			
	No.	*Per Cent*	*No.*	*Per Cent*	*Difference*	*Difference / P.E. Dif.*
Total number	163	12.2	1,173	87.8		
No ill effect	17	10.4±1.6	262	22.3±0.8	—11.9±1.74	6.8
Local Reactions:						
Soreness—						
slight	37	22.7±2.2	445	37.9±0.9	—15.2±2.41	6.3
moderate	58	35.6±2.6	329	28.0±0.9	+ 7.6±2.70	2.8
severe	42	25.8±2.3	94	8.0±0.5	+17.8±2.34	7.6
Redness—						
slight	40	24.5±2.3	279	23.8±0.8	— 0.7±2.42	0.3
moderate	47	28.8±2.4	157	13.4±0.7	+15.4±2.51	6.1
severe	26	16.0±2.0	36	3.1±0.3	+12.9±1.97	6.5
Swelling	95	58.3±2.6	447	38.1±0.9	+20.2±2.79	7.2
General Reactions:						
Headache	31	19.0±2.1	81	6.9±0.5	+12.1±2.14	5.7
Backache	13	8.0±1.4	25	2.1±0.3	+ 5.9±1.43	4.1
Chilly	24	14.7±1.9	31	2.6±0.3	+12.1±1.90	6.4
Fever	27	16.6±2.0	53	4.5±0.4	+12.1±1.99	6.1
General aching	27	16.6±2.0	72	6.1±0.5	+10.5±2.00	5.3

more likely to have reactions, but was not specific in this regard. Even if the test were positive in an individual it did not invariably or even usually follow that if the alum-precipitated toxoid were injected, a severe reaction would result.

These results led us to inquire as to whether this test, like the reactions to the injection of alum-precipitated toxoid was related to (1) skin sensitiveness in individuals who had some previous indication of the allergic state, or (2) specific sensitization to diphtheria protein.

Table V shows the relation between a positive Moloney test and personal or family history of allergy, by sex. It is evident that such a history has little if any bearing upon the result of the test.

The relation between a positive Molo-

TABLE V

Relation Between Allergic History and Moloney Test by Sex

	Positive to Moloney Test				*Negative to Moloney Test*			
	Male		*Female*		*Male*		*Female*	
	No.	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
Family History of Allergy	137	32.5	78	37.5	618	33.7	264	35.4
Personal History of Allergy	41	9.7	39	18.7	189	10.3	104	13.9
No History of Allergy	243	57.7	91	43.7	1,025	55.9	376	50.5
Total	421	99.9	208	99.9	1,832	100.0	744	100.0

TABLE VI

Schick and Moloney Test—Relation to Previous Diphtheria Immunization

	No Previous Immunization Moloney Test +			*History of Previous Immunization Moloney Test +*		
	Total	*No.*	*Per Cent*	*Total*	*No.*	*Per Cent*
Schick +						
Males	1,104	93	8.4	489	93	19.0
Females	455	57	12.5	199	49	24.6
Total	1,559	150	9.6	688	142	20.6
Schick —						
Males	296	118	39.9	364	117	32.1
Females	119	44	37.0	179	58	32.4
Total	415	162	39.0	543	175	32.2

ney test and some previous experience with the protein of the diphtheria bacillus either through artificial immunization or a natural contact sufficient to produce a negative Schick test, is presented in Table VI.

Among those who were Schick positive and gave no history of artificial immunization and who therefore constitute the group which have had the least opportunity for previous contact with diphtheria protein, the percentage of Moloney positives is lowest —9.6 per cent. Even though the Schick was still positive, but there was a history of previous artificial immunization, the percentage of positive Moloneys was increased to 20.6 per cent. Among the groups who were Schick negative with or without a previous history of artificial immunization the percentage of Moloney positives was highest. There is evidently a high degree of correlation between previous contact with diphtheria organism or its products and the occurrence of a positive Moloney reaction.

FOLLOW-UP SCHICK TESTS IN STUDENTS GIVEN 0.5 C.C. OF ALUM-PRECIPITATED TOXOID

Six hundred and thirteen students with positive Schick tests who had been given 0.5 c.c. of alum-precipitated toxoid were given subsequent Schick tests from 2 to 4 months after the inoculation. Of the entire group, 88.9 per cent had become Schick negative. The degree or duration of this immunity has not been determined. The percentage of these young adults made Schick negative by one dose of alum-precipitated toxoid is not as great as that reported for younger children.[1-5]

TABLE VII

Schick Test 2-4 Months After 0.5 c.c. of Alum Precipitated Toxoid

	Male		*Female*		*Total*	
	No.	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
Schick —	389	87.6	156	92.3	545	88.9
Schick +	55	12.4	13	7.7	68	11.1

SUMMARY

1. Of 3,205 young adults tested at the University of Minnesota in 1935, 70.1 per cent had positive Schick tests. Of the entire number 1,231 gave a history of having been artificially immunized.

2. Of the Schick positive students 1,900 were given 1 dose of 0.5 c.c. of alum-precipitated toxoid. Local or general reactions severe enough to make the student seek medical care in the Health Service dispensary occurred in 34, or 1.7 per cent. In 5, or 0.26 per cent, sterile abscesses developed.

3. There was no correlation between the personal and family history of allergy and the reactions following the injection of alum-precipitated toxoid.

The percentage of local and constitutional reactions following the inoculation of alum-precipitated toxoid was significantly greater in those who showed positive as compared with those who showed negative Moloney tests. However, 10 per cent of those students who had positive Moloney tests reported no reaction, and 70 per cent local or general reactions of little importance.

4. A positive Moloney test shows little or no correlation to personal or family history of allergy.

The Moloney test shows a high degree of correlation with previous exposure to diphtheria proteins as indicated by a negative Schick test or a history of artificial immunization.

5. Follow-up Schick tests were given to 613 students from 2 to 4 months after 1 injection of 0.5 c.c. of alum-precipitated toxoid—88.9 per cent of the group had become Schick negative. The degree or duration of this immunity was not determined.

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Vitamin Advertising

THE present spectacle of vitamin advertising running riot in newspapers and magazines and via radio emphasizes the importance of the physician as a controlling agent in the use of vitamin products.

Mead Johnson & Co. feel that vitamin therapy, like infant feeding, should be in the hands of the medical profession, and consequently refrain from exploiting vitamins to the public.—*Bull.* San Diego Co. Med. Soc. Mar. 5, 1937.

Working Environment*

ALBERT S. GRAY, M.D., F.A.P.H.A.
Director, Bureau of Occupational Diseases, State Department of Health, Hartford, Conn.

ECHOES of the effects of working environment on health rumbled down through the centuries to our very gates. Little was actually done, however, to remedy the untoward effects of working environment on health. In this country it is only within the past 25 years that a real development has taken place. Previous to this time most of the efforts put forth to remedy conditions of working environment concerned themselves largely with improvements of conditions readily observable by mere inspection.

Hamilton's survey in Illinois in 1910, and Hayhurst's of Ohio in 1915 provided startling evidence of the effects on the industrial worker of exposure to toxic materials.

This period saw the formation of a division of industrial hygiene and sanitation in the U. S. Public Health Service, the organization of the Bureau of Mines, the inclusion of courses in industrial hygiene as part of public health work in universities, the inclusion of a Section on Industrial Hygiene in the American Public Health Association, the first Workingmen's Compensation Laws, the formation of a Committee on Industrial Hygiene in the Conference of the State and Provincial Health Authorities, and the development of statistics of the vast number of those potentially exposed to occupational diseases, the many and various materials and processes potentially hazardous to health, and the variety of the hundreds of occupations representing possible exposure.

In the latter part of this time a more scientific approach was made to the problem. It was not enough to know that workers were exposed to materials or processes that would affect health or to know the actual pathology and end result of exposure, it was necessary to know the mechanism of the effects of these materials. In addition to qualitative methods, information that could only be determined by quantitative means was essential—to tie up and correlate pathology with the amount and degree of exposure. Quantitative information on the threshold amount of these materials that would cause disease was necessary before sound methods of control could be instituted in industrial environment to prevent and control the occurrence of disease, for while compensation was important, prevention was the end result to be sought for.

The mechanism of lead poisoning was given us by Aub, Kehoe, and Fairhall; of dusts by Gardner, Lanza, Pancoast, Pendergras; quantitative information on noxious gases by Henderson and Haggard; surveys, studies, and research work of the U. S. Public Health Service gave us information of the effects of

* Address of the Chairman of the Industrial Hygiene Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 20, 1936.

dusts and other toxic materials definitely correlating the effects of specific amounts of hazardous materials on health in quantitative terms. The surveys, studies, and research work of the Bureau of Mines in dusts, gases, and organic solvents, added to our knowledge. The committee reports of the Section of Industrial Hygiene of the American Public Health Association have gained world-wide recognition as being authoritative and unbiased and representative of the best brains the country affords in industrial hygiene. Many universities, notably California, Cincinnati, Columbia, Harvard, Johns Hopkins, Pennsylvania, and Yale, some of the larger insurance companies, and industry itself added to the veritable flood of material poured out—particularly in the latter part of this period. It became evident that here was a public health problem of first importance, affecting the morbidity and mortality of millions of people.

Control of conditions so seriously affecting such a large group of the productive population cannot properly be undertaken except by an agency experienced in disease control. The control of communicable disease has always been recognized as a function of the health department. This control is purely for prevention of disease and death.

Occupational disease control represents exactly the same close relationship to the health of the adult population as communicable disease control does to the health of the child population.

At the present time the greatest morbidity and mortality are not associated with childhood but with chronic degenerative diseases which appear in adult life and are particularly rampant in the industrial working classes.

Ten years ago L. R. Thompson of the U. S. Public Health Service stressed the necessity of undertaking industrial hygiene work as part of the preventive program of health departments.

Haven Emerson in his presidential address before the American Public Health Association [1] stressed the importance of incorporating "within the permanent functions of health departments protection of employed persons against health handicaps inherent in the place and nature of their work."

Resolutions have been passed by the Conference of State and Provincial Health Authorities, the American Public Health Association, and the American Medical Association recognizing the necessity of including the control of occupational disease as an integral part of a complete public health program.

Health authorities have developed a mechanism for the control of occupational diseases just as they have for the control of communicable diseases; the application of precise physical and chemical procedures to conditions affecting health in industrial environment by specially trained technical personnel. The effect is known of many of the potentially hazardous materials with definite data relative to the threshold dose and limits of exposure. Control of industrial environment to maintain the exposure of the individual within safe limits is accomplished by the institution of modern scientific principles of preventive medicine.

The Industrial Hygiene Committee of the Conference of State and Provincial Health Authorities of North America, formed in 1921, has been exceedingly active in this phase of public health work in the last decade. Statistics have been gathered on the number of individuals potentially affected by toxic materials in the various states. The health officers have been informed of the developments in industrial hygiene; the committee has worked out the qualifications of the personnel necessary to

undertake this work, the laboratory facilities required, and the costs, and in addition has provided its members with a bibliography of the important modern works on industrial hygiene.

For the past several years health officers have been faced with the difficult task of securing sufficient appropriation for personnel and technical facilities to carry on their activities. In the short time Social Security funds have been available for public health purposes, 17 states have secured funds for industrial hygiene purposes and now have laboratory facilities and technical personnel in their departments of health organized specifically for the prevention and control of occupational diseases.

This has not been a development of a day or a year, or a decade. Preventive medicine is the gradual development of the centuries, and prevention of occupational disease today consists of the presentation of definite facts, predicated upon precise physical and chemical determinations of the industrial environment, interpreted in terms of occupational disease control by a technically trained personnel and enforceable in such a way that the enforcement does not give rise to injuries or injustices more serious than the abuses it aims to correct.

REFERENCE

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New Federal Aid for Health and Sanitation

IN February the United States Congress enacted a law creating a Disaster Loan Corporation. Following this action Congress also passed a Joint Resolution authorizing the U. S. Public Health Service to use funds from the First Deficiency WPA Appropriation Bill for health and sanitation work in the 177 counties of the Flood Areas:

Resolved, etc., That the President is hereby authorized to allocate funds to the U. S. Public Health Service for health and sanitation activities in the areas recently stricken by floods from the appropriation made in the Emergency Relief Appropriation Act of 1936, as supplemented by the appropriation for relief and work relief in the First Deficiency Appropriation Act, fiscal year 1937, for the following purposes: (1) Grants to States for the purpose of aiding such States, or any county, health district, or other political sub-division thereof, in establishing and maintaining adequate public health services in the prevention and control of diseases in the areas recently stricken by floods, under regulations prescribed by the Surgeon General of the U. S. Public Health Service; (2) the employment of personnel in the City of Washington and elsewhere, without regard to the civil service laws and regulations and the Classification Act of 1923, as amended, to replace commissioned officers and other employees of such Public Health Service detailed to such areas; (3) reimbursement of appropriations of such Service for expenditures made from such appropriations for emergency work in such areas; and (4) the purchase of supplies and equipment to replace articles furnished from stock on hand for the care, support, and maintenance of flood refugees and in rendering assistance to health authorities.

The allocations made by authority of this joint resolution shall not be exclusive but shall be in addition to those which otherwise may be made under the provisions of such Emergency Relief Appropriation Act of 1936, as supplemented.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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FEDERAL LEGISLATION TO CONTROL FOODS, DRUGS, AND COSMETICS

The Copeland Bill

SINCE June, 1933, a number of bills to modernize and strengthen the Federal Food and Drug Act of 1906 have been considered by the Congress of the United States. One of these measures, Senate Bill 5, was passed by the Senate on May 28, 1935, but more than a year elapsed before it was acted upon by the House of Representatives. In the closing days of the 74th Session, the House passed this bill in an amended form. A compromise measure suggested by Senator Copeland was then adopted by the Senate, but failed to pass the House on June 20, 1936, the day Congress adjourned.

A new S. 5 was introduced in the 75th Congress by Senator Copeland, and on March 9, 1937, was passed in the Senate. This bill, to prevent the adulteration, misbranding, and false advertisement of food, drugs, devices, and cosmetics in interstate, foreign, and other commerce subject to the jurisdiction of the United States, to safeguard public health, and prevent deceit upon the purchasing public, is a distinct improvement over existing law, although it contains some serious defects.

In addition to prohibiting the adulteration and misbranding of foods, drugs, devices, and cosmetics shipped in interstate and foreign commerce, this bill also prohibits the dissemination by the mails or in interstate commerce in any manner or by any means, including radio broadcast, of any false or misleading advertising of these products. Advertising which represents any drug or device to have any therapeutic effect in the treatment of Bright's disease, cancer, tuberculosis, poliomyelitis, venereal diseases, or heart or vascular diseases is absolutely prohibited except to the medical, dental, and pharmaceutical profession.

These excellent provisions are, we believe, weakened somewhat by a clause stating that any representation concerning the effect of a drug or device shall be deemed to be false and misleading if not supported by persons who, by reasons of scientific training and experience, are qualified as experts on the subject to which such representation relates. There are, unfortunately, pseudo-experts as well as real experts whose opinions might prevail in such matters.

A new method of enforcement is authorized, in addition to the usual criminal prosecution and the seizure and multiple seizure, by process of libel, of products violating the terms of the law. The several district courts of the United States are vested with jurisdiction to restrain by injunction the violation of provisions of this law.

General enforcement of the law is properly given by this bill to the Secretary of Agriculture, but it is stated that nothing in the act shall impair or diminish the powers of the Federal Trade Commission under existing law. A controversy as to whether the advertising features of the proposed law should be enforced by the Federal Trade Commission or the Secretary of Agriculture was chiefly responsible for the failure of the bill to pass in the 74th Congress.

The extended provisions of the bill regarding foods are, in general, comparable to those in the present law, with numerous additions and improvements. Thus, foods for special dietary purposes, or for use by infants and invalids may be required by regulation to be labelled with statements concerning their mineral, vitamin, and other dietary properties. Standards for the identity and quality of food are provided for, and labeling of unstandardized food to disclose ingredients is required. Traffic in food dangerous to health is prohibited, as is also the addition of poison to food, or the use of poisonous containers.

Among other interesting provisions in this bill is one forbidding traffic in confectionery containing metallic trinkets and other nonnutritive substances, except harmless coloring, that may be dangerous to health. Artificial colors and flavors in foods must be declared on labels, and all foods must be prepared and handled under conditions of reasonable cleanliness. Emergency license control is authorized for foods that might be contaminated during manufacture, where their injurious nature cannot be determined after the articles have entered interstate commerce.

Certain of the drug sections of this bill have been criticised by the organized medical profession because the bill permits a drug to differ from the standards set forth in an official compendium, provided its strength and quality are plainly stated in the label.[1] It is difficult to see how such labeling would protect a purchaser of a hyper- or hypo-potent drug. Similarly, no provision is made for setting up definite standards for therapeutic devices, many of which may present hazards as well as benefits to health.

Cosmetics under the proposed law include all beautifying agents except soaps intended only for cleansing. In defining adulteration of a cosmetic, there is an exemption for coal-tar hair dyes, provided they are labelled with the caution that they may cause skin irritation on certain individuals and should be tested for such reactions.

Despite its few shortcomings, the Copeland bill, S. 5 is a noteworthy advance over the existing law. It is superior to other bills that have been introduced to amend the Food and Drug Act, particularly some now pending in the House; and it deserves general support. Aside from its effects in strengthening the law

of 1906 in a number of important aspects, this bill offers valuable control over improper advertising of foods, drugs, and cosmetics, and provides for the first time a reasonable means of regulating the previously unregulated cosmetics.

Sanitarians should advocate the passage of this federal legislation, the principles of which have been indorsed by this Association.[2] It is to be hoped, however, that the bill may be amended in some of the particulars mentioned, if it has not already been so amended by the time this editorial is published.

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2. Editorial. The Copeland Bill. *A.J.P.H.*, 25:961 (Aug.), 1935.

THE NASAL CARTILAGES IN MAN

IN our review of *An American Doctor's Odyssey*, by Victor Heiser,[1] we criticised the statement that the Negro has an undivided cartilage at the end of his nose and that this was a sure test of Negro blood, extending even to octoroons. We stated that it was not true of the Negro as found in America.

The correctness of this criticism having been questioned, a fairly extensive correspondence with anatomists in the United States has been carried on. Dr. Aleš Hrdlička Division of Physical Anthropology, U. S. National Museum, has been good enough to give me the following quotation:

> Racial differences in the nasal cartilages of man have already been described by a number of authors, notably by Virchow ('12; whites and Negro) ('13; Japanese), Schultz ('18; whites and Negroes), Burkitt and Lightoller ('23; Australian aboriginal), v. Eickstedt ('26; Melanesians and Negroes), and Wen ('30; white and Negroes). On the basis of these reports it appears that in general the nasal cartilages are relatively larger in whites than in the colored races, that the roof cartilage of the former tends to assume a quadrangular (trapeze) shape, whereas that of the latter most frequently a triangular shape, that the lower border of the wing cartilage is more nearly horozontal in whites than in other races, and that the free, anterior border of the septum cartilage is more prominent and more curved in the former than in the latter. Furthermore, the mostly small, interculated cartilages of irregular size and distribution along the upper and posterior border of the wing cartilages are much more common in whites than in colored races and are extremely rare in other primates. According to the report by Meriel ('25) on the nasal cartilages of forty white, interculated cartilages occur in 80 per cent of the cases.[2]

In addition to this, Dr. Hrdlička has given 9 references which are at the disposal of anyone interested in the matter. We trust that will serve to correct for our readers at least the mistake made in *An American Doctor's Odyssey*.

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2. Schultz, A. H. *Am. J. Phys. Anthropology*, 20:205–212, 1935.

MUDDLED INFORMATION ON HEALTH

IN the March, 1937, issue of the pocket-sized magazine, *Coronet*, there is a pocket-minded article under the misleading title, "Is Milk Cancer's Ally?" This masterpiece of misinformation has been roundly condemned in an excellent editorial in a recent issue of the *Journal of the American Medical Association*.[1] Not only are we glad to join in that well merited condemnation, but consider it a public health duty to do so.

In the long history of popular presentations of health material, there have probably been few more stupid articles than this one. Aside from the fact that

an author unknown to science, who obviously has a superficial and generally erroneous knowledge of both cancer and milk, has thrown together a collection of fallacies on these topics, the article is vicious in that it will cause fear in the minds of many lay readers who are unaware of the craving for sensationalism that apparently was the only motive for this particular diatribe.

Most editors of popular magazines, fortunately, realize that they owe a duty to their readers to give only authentic and reliable facts when they present information on the important subject of human health. Contrast the attitude of the editor of *Coronet* in printing this poppycock with that of the National Association of Science Writers, which recently asked the Cancer Council of the American Society for the Control of Cancer to answer certain significant questions.

One of these questions concerned the effect of diet on cancer. The reply was that no experimental data have ever been obtained to justify the acceptance of any theory that there is a positive relationship between diet and cancer.[2] The editor of *Coronet* might have ascertained that indisputable fact before printing the hokum that he has printed.

REFERENCES

1. Editorial. *J.A.M.A.*, 108:889, March 13, 1937.
2. Press Release. Am. Soc. Control of Cancer, March 15, 1937.

WESTERN BRANCH A.P.H.A. MEETING

THE Western Branch, American Public Health Association, will hold its Eighth Annual Meeting in Phoenix, Ariz., April 13–15. The meeting will be a joint one with the Arizona and the New Mexico Public Health Associations, each of which will hold a one day session on April 12. This is the first time that the Western Branch has met in the Southwest, and the committee on local arrangements, under the chairmanship of Dr. George C. Truman, is making elaborate preparations. The meeting will immediately follow the annual Surgeon General's Conference and the Conference of State and Provincial Health Authorities of North America in Washington, D. C. It will also follow the meeting of the California Tuberculosis Association in Riverside, Calif., on April 1–3. Those attending the Washington meetings may wish to return to the West via Phoenix, and those attending the California Tuberculosis Association meeting may wish to motor to Phoenix, spending a day or so at Boulder Dam and at the Grand Canyon, each of which is reached by easy stages en route to Phoenix. Phoenix is a beautiful city of nearly 50,000, the state capital of Arizona, in the heart of historic Indian country, and on the trail of the Apaches and the Spanish Conquistadores.

The program this year presents a departure from previous Western Branch meetings. It will present two or not more than three papers on major subjects at each of the scientific sessions, allowing ample time for formal discussion and for discussion from the floor. Among the topics to be covered are: "A Mental Hygiene Plan Suitable for State and Full-time Local Health Departments," "Industrial Tuberculosis, its Incidence and Prevention," "Official Public Health Nursing Programs," "Recent Progress in the Treatment of Pneumonia," "Public Health Legislation," "A Venereal Disease Control Program for State and Full-time Local Health Departments," "Recent Advances in Public Health Administra-

tion," and "The Effects of Residence Allocation on Death Rates from Certain Diseases."

Dr. H. E. Young of Victoria, B. C., President of the Western Branch, will preside at all general sessions. Dr. Platt W. Covington of the Rockefeller Foundation, Salt Lake City, is President-Elect of the Western Branch and Chairman of the Committee on Meetings and Publications.

Current reports from the special committees of the Western Branch will be presented at this meeting. These will include those of the special Committee on Sylvatic Plague, the Committee on Health Education, with a sub-committee report on the technics of using the radio for health education messages, the Committee on Public Relations, and the Committee on Public Health Exhibits for the 1939 San Francisco Bay Exposition.

The newly formed Laboratory Section of the Western Branch, under the Chairmanship of Dr. W. H. Kellogg, will hold one or two special sessions. There is the possibility of the formation this year of a Vital Statistics Section of the Western Branch.

Officers of the Branch are:

President:	H. E. Young, M.D., Victoria, B. C.
President-Elect:	Platt W. Covington, M.D., Salt Lake City, Utah.
Vice-Presidents:	Frederick D. Stricker, M.D., State Health Officer, Portland, Ore. F. E. Trotter, M.D., Territorial Health Commissioner, Honolulu, T. H. J. Rosslyn Earp, Dr.P.H., State Director of Public Health, Santa Fe, N. M.
Treasurer:	William F. Higby, San Francisco, Calif.
Secretary:	William P. Shepard, M.D., San Francisco, Calif.

IN THE MAY ISSUE

Recent Progress in Health Education
W. P. Shepard, M.D.

Uses of the Life Table in Vital Statistics
Louis I. Dublin, Ph.D., and *Alfred J. Lotka, D.Sc.*

Obstacles and Aids to Communicable Disease Nursing
Alma C. Haupt, R.N.

Institutional and Other Small Water Treatment Plants to Meet Unusual Conditions
Frank R. Shaw, C.E.

A Critical Study of Various Types of Detergents and Disinfectants for Use in Dishwashing
W. L. Mallmann, Ph.D.

Summer School Courses in Public Health

LETTER FROM GREAT BRITAIN

TRENDS IN RELATION TO PUBLIC HEALTH

Schemes for housing the people of this country being well forward, opportunity is now being taken to give attention to other matters. These activities on the part of other nations suggest that it is necessary for us to deal with them if we are not to be left limping hopelessly behind. Admonished by directors of physical education who have been impressed by the sight of foreign stadia full of hefty females keeping themselves fit by carrying out physical exercises of an astonishing complexity, government departments have concluded that what this nation is short of is physical fitness. At the same time also, certain physiologists and dieticians have created a belief in many minds that—mainly because of the ignorance of the average housewife of the elementary rules of dietetics, economics and household management, and incapacity to apply them even if she knew them—there is real reason for concern as to the state of large sections of the population so far as regards nutrition. As a result, efforts are being made to discover a means of coping with this problem, and numbers of investigators, official and other, are engaged in investigating and publishing reports, some of which show there is really not very much wrong, while others reveal with equal clearness that conditions are extremely unsatisfactory, and unless and until something drastic is done it will be useless to attempt to secure physical fitness or anything else.

NUTRITION

Very naturally it is upon children that the bulk of the investigating is done, and to them that efforts to secure improvements in nutrition are directed. For a number of years annual reports of district medical officers of health and school medical officers, as well as those of the Chief Medical Officer of the Board of Education, have contained details of special enquiries into the state of nutrition of groups of school children and the operation of schemes for supplying milk in schools. The annual report of Sir Arthur MacNalty, Chief Medical Officer of the Board of Education, for 1935 is particularly informative in both regards. The general conclusion reached in respect of nutrition is that though it is difficult to make a quite accurate assessment and comparison, conditions are very far from so bad as many fear and, indeed, allege. In London, of 189,203 children examined, some 5.67 per cent were marked as "slightly subnormal," and 0.08 as "bad." The percentage of "normal" was 76.89, and of "excellent" 17.36. In the country as a whole, 88.7 per cent were marked normal or excellent, 10.6 slightly subnormal, and 0.7 bad. The extent to which free meals were provided during 1935–1936 was somewhat less than in 1933–1934 and 1934–1935. This is taken to suggest that conditions in 1935–1936 were definitely better than in 1933–1935.

MEALS AND MILK FOR SCHOOL CHILDREN

In 1935–1936 the total number of solid meals was 23,000,000 as against 25,000,000 in 1934–1935. Of solid and milk meals combined on the other hand, there was an increase in the number provided free from 68,000,000 in 1934–1935 to 87,000,000 in 1935–1936. This

was entirely due to milk meals which had increased as a result of the operation of the milk-in-schools scheme. Under this, school children are provided with one-third of a pint of milk for a halfpenny or, under certain circumstances, free. Introduced in October, 1934, this scheme worked with great smoothness and met with immediate success, large numbers of children taking advantage. Unfortunately, as time has gone on enthusiasm has waned somewhat and the percentage of elementary school children taking milk under the scheme which at 31st March, 1935, was 48.7 declined to 45.8 at 31st March, 1936. Sir Arthur MacNalty quotes from a number of reports showing that milk drinking has led to improvement both in health and mentality on the part of those indulging in it. At the same time, however, it is clear that he regards with some misgiving a decline in the numbers of drinkers in the first full twelve months of working. More particularly it appears to him regrettable that of those who pay for and take milk when school is open, only some 12 per cent attend for it during holiday time. The fact that there are children who have a distaste for milk, or who for one reason or another will not have it or go off it, he regrets also. As a suggestion to meet some at any rate of these objections Sir Arthur offers that flavouring agents of one sort or another might be tried.

DRINKING HABITS OF CHILDREN

Interestingly enough, quite recently there has been issued by the Hannah Dairy Research Institute in Scotland a report on "An Inquiry into the Drinking Habits of Children of School Age, with Special Reference to Milk Drinking," conducted by Dr. Norman C. Wright, in which there are references to attempts made to stimulate flagging milk appetites in this way. From the report it appears that the results were not encouraging, any increase in demand being only short lived. The findings generally seem to have been of a type that did not make for enthusiasm. Scottish children of school age, it seems, are not greatly given to milk drinking. Actually of 13,317 included in the enquiry, over 50 per cent did not drink milk at all, and of the remainder, two-thirds only took it once a day. The favourite beverage apparently was tea; cocoa was seldom drunk, and coffee practically not at all. In Scotland, as in other parts of the country, the milk-in-schools scheme makes provision for supplying milk free as well as at a small fixed charge. In this connection it is interesting and perhaps encouraging also to record that the decrease in demand for milk noted was exclusively among the children who pay, the number receiving free milk showing a progressive increase. The comment that might be made here is, of course, obvious. In the report, however, it is not made, the conclusion reached and put forward being universal distribution of free milk to all children attending state-aided schools. This course is urged and claimed as essential for the ultimate success of the milk-in-schools scheme. Though there are certain legal difficulties in the way of the putting into operation of such an arrangement, the main obstacle, I imagine, would be financial. That and a feeling that there was something in the nature of pauperisation involved, or that if it could be so very freely dispensed, milk could not be so important as was pretended. Intended to deal with the drinking habits of school children, this report contains an amount of information with regard to their eating habits as well. This adds very greatly to its interest and value.

HEALTH OF THE ENGLISH SCHOOL CHILD

Sir Arthur MacNalty in his report, perhaps I should mention, discusses a variety of other subjects than nutrition. This its title—The Health of the School Child—reveals. Next after nutrition, in fact, he takes up Physical Education and Health Education and, having described under the head of "Medical Inspection and Treatment" what was done during 1935 in these connections, he provides a review of activities and results in relation to Welfare of Young Children; the Orthopaedic Service; Acute Rheumatism; the School Dental Service; and Mental Deficiency. The opening remarks of Sir Arthur in his introduction, emphasize the need for full recognition of physical education in the school curriculum, for the provision of proper facilities and for fully trained teachers, all of which he claims as essential to the future development of physical education. In the special section on physical education and health education it is shown that endeavour is being made to meet the view of the Board of Education that the services of an organiser of physical education should be available in every area. Actually, at the beginning of 1936 over half of the authorities had made appointments and since then many additional proposals had been submitted to the Board. In the same section details are given of the extensive provision made for health education by health and education authorities. Arrangements for carrying out medical inspection and treatment in this country, it is generally accepted, are very complete. The facts and figures contained in this report show that this belief is well founded. It is interesting to find, however, that at the moment there is a fairly widespread feeling that the time is ripe for modification in the scheme which has been in operation now for a number of years. In certain areas medical officers are engaged in trying out new schemes and there are hopes that something much more simple will be evolved. This will be to the advantage of the children; especially, however, it will be to the advantage of school medical officers who are liable to find the work of medical inspection terribly monotonous and themselves engaged merely in cataloguing defects.

THE SCHOOL MEDICAL SERVICE

At the moment the service consists partly of whole-time school medical officers and partly of officers giving part time. The total amount of time given is equivalent to the whole-time service of 687 officers, or approximately 1 to 7,140 school children in average attendance. In addition to the school medical officers there are 962 specialist medical officers, practically all part-time; 852 whole- and part-time school dentists (1 to 7,600 children), and a nursing staff equivalent to 2,386 whole-time school nurses. The total number of children passed under medical review in 1935 was 2,987,283, representing 60.9 per cent of the average attendance. Details of work done on behalf of some at any rate of the children found to be in need of attention are given in other sections of the report, information with regard to specialist work being contained in that relating to the orthopaedic service and in that on the work of the dental service. In the case of orthopaedics, though it is admitted that satisfactory progress has been made by a considerable number of authorities, Sir Arthur wants still more special open-air hospitals, orthopaedic clinics, remedial exercises clinics, and local associations of voluntary workers. Also he considers that still further attention should be given to prevention by increased facilities for physical training

and correction exercises, and more attention to hygiene, seating, and general school conditions. Reviewing dental work, the report shows that in 1935 there was one of the largest increases in personnel recorded in any single year to 646 officers from 604. Also for the first time in the history of the service the number of fillings in permanent teeth exceeded one million, being actually 1,028,309.

ACHIEVEMENTS OF THE SCHOOL MEDICAL SERVICE

In the final chapter, Sir Arthur seeks to provide an answer to a question often asked as to what the country is getting in return for the great sums expended on the school medical service. Without much difficulty he shows that the elementary school child is almost immeasurably healthier than was the corresponding child of 25 years ago. Moreover, from the mass of statistics there emerges that the school population is demonstrably becoming heavier and fitter, and this being so, it is difficult to resist the conclusion that it is becoming also healthier and fitter—at any rate physically. One particularly striking feature shown on looking back 10 years from 1935 to 1926 and comparing the statistics of the two is a diminution in the incidence of tuberculosis. Definite pulmonary tuberculosis, for example, which in 1926 showed a figure of 0.4 per 1,000 children examined, in the 1935 returns came out at 0.1 per 1,000. The figures for "suspected" pulmonary tuberculosis were 1.3 per 1,000 in 1926 and 0.4 per 1,000 in 1935. For non-pulmonary tuberculosis the rate per 1,000 of those medically inspected in 1926 was 1 and in 1935, 0.6. Speaking generally, Sir Arthur regards the results as encouraging. Further, he claims that the school medical service has a wonderful record of achievement in its past, adding, however, that great as this may have been there still remains much more to be done, since: "The younger generation is emerging into a more exacting and complex world than its parents faced in their younger days"; and, "To preserve the school child's mental and physical health for the struggle of life is at once the task and the privilege of the school medical service."

CHARLES PORTER, M.D.

PUBLIC HEALTH EDUCATION*

Be Up-to-Date—And Accurate—Quotation from a review of a recent health education book:

> The bibliography in several instances does not give the latest revised editions of references.

Another review of a recent book says:

> Materials such as printed matter, slides, and movies are carefully listed, but unfortunately some of the items are no longer issued.

Important books by leading health workers issued by prominent publishers have listed out-of-print material and motion pictures no longer available.

Result: many futile letters are written.

Something to Do Something About?—A boy's club cherry pie eating contest to celebrate Washington's birthday (!) aroused one almost "Constant Reader" of this department. C. R. did not call for "a law against" pie eating contests, but did urge that health and dietetic leaders "do something" to ruin the publicity values of such a contest.

Now Called by Its Right Name—*Editor and Publisher,* chief journal of the newspaper world, reported Feb. 13, 1937, that—

> The nation-wide campaign of the press to rout syphilis was crystallized Feb. 3 when, for the first time, National Social Hygiene Day was observed in the United States.
>
> In Chicago, the day was heralded as the result of the efforts of the *Tribune* to focus public opinion on venereal diseases. Not only was the *Tribune* given credit for being the first newspaper that dared to print the words syphilis and gonorrhea, but it was also credited by Dr. Frank Jirka, State Health Commissioner, for being the first to put these words on the air 6 years ago over WGN.
>
> Today, however, the *Tribune* is not alone in its war on syphilis. Newspapers and magazines everywhere are turning the spotlight of publicity on this scourge.

The article goes on to review the recent past and present doings of leading newspapers in New York City, New Orleans, Memphis, Des Moines, Detroit, Cincinnati, St. Louis, San Francisco, Los Angeles, Boston, Pittsburgh. And as go the newspaper leaders in those cities, so go the newspapers generally throughout the country.

Clinic in These Columns?—As has been suggested, detailed but constructive criticism will be offered on health education material submitted for that purpose.

Address specimens to the editor of this department, accompanied by a postal card or letter.

No! Ca! Che!—Three Times No!—in Zulu and Sesuko, as well as English. These words are from a broadside on flies, impukane, or lintsi. This and other interesting educational material accompanied a letter from C. C. P. Anning. Medical Officer of Health, Benoni, South Africa, who says:

> As a member of the Public Health Education Section of the Association, I read your monthly pages in the *Journal* with the greatest interest, and many of the ideas put

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* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

forward month by month are being adopted in my own department. Just in the same way that many of the stimulating ideas that I had the pleasure to collect during my Carnegie trip in 1935 in your delightful country are coming out now in the daily routine of work in this South African town. . . .

The town, of some 90,000 inhabitants, in which I am now Health Officer, is of recent growth—in the centre of Gold mining area—and we are just starting to build up our Health Services under the department's motto of "Through Education to Health."

The Low Cost of Giving—An editorial in *Hospitals* (18 E. Division St., Chicago, Ill.) for March, 1937, "The Low Cost of Hospital Giving," considers income tax deductions on gifts to hospitals and other institutions.

The donor may create a trust for the hospital he favors, which trust would be irrevocable, absolute, and indefeasible, and he may retain the income of the trust fund for life, and may deduct the amount of the gift from his gross income for the year in which the gift is executed. If the trust fund was $25,000, and the income on it was to go to the donor during his life and at his death the trust was to go to the hospital the present value of the trust, subject to the 15 per cent limitations, would be deductible from the gross income of the donor. Under existing favorable rulings as to methods of computation of deductible income the donor at the age of 50 years could give his hospital $25,000 at the net cost of approximately $12,000. Many philanthropists are influenced in making present gifts to hospitals by the low net cost of their giving.

Hospitals would do well to present a study of these costs to their friends and potential benefactors. Where the donor is very wealthy and his income is proportionately large, the present gifts he makes will cost him less than half of the amount given. In addition the hospital will enjoy the income from the present gift, which will add a considerable sum each year to its endowment income.

Prestige or Face-Saving — We have been asked if it is necessary for every local health department, or even every state department to write and print its own health education material.

This department answers, "No." The one argument for "Yes" is prestige, or "saving face." But is there prestige in sending out dull writing and poor printing?

If we must print our own leaflets or booklets is it necessary for us to prepare original copy—if better copy has already been written elsewhere?

After all, why not use some of the well prepared health printed matter issued by insurance companies, and others? Many health departments are doing this. Many of them have distributed *Readers' Digest* reprints of Dr. Parran's syphilis article. Many health agencies use material issued in quantity by national health associations.

Not nearly so many reproduce publications issued originally by other health agencies.

Must some of us continue "face saving" and work harder and spend more money to do so?

Health in Advertising Awards—The Annual Advertising Awards are sponsored by *Advertising and Selling*, 9 East 38th St., New York, N. Y., outstanding journal in the advertising field.

The Public Health Institute, 159 N. Dearborn St., Chicago, Ill., was given a medal award

for a campaign which contributes most to the advancement of advertising as a social force.

Objectives: To induce victims of venereal diseases to make use of the Institute's facilities; to protect those without means for private physicians from quacks and unscrupulous druggists; to inform the general public of venereal dangers.

Appeals: Personal fear; the Institute's non-profit, humanitarian character; its record of treatment.

Parke, Davis and Company, received honorable mention for the advertisements which our readers have seen. Other advertising with health implications was given honorable mention.

A medal award went to World Peaceways, 103 Park Ave., New York, N. Y., for a remarkable series of anti-war advertisements appearing in national magazines.

In *Advertising and Selling* for Feb. 25, 1937. *50 cents* for this issue.

Silence No Longer — Apparently broadcasting and journalism are no longer inhibited in speaking of social disease. At least the widespread celebration of Social Hygiene Day suggests that syphilis and venereal disease word blacklisting is more the exception than the rule.

It is now up to health workers and their allies to make the best of the opportunity. Good taste and effective educational methods are called for as much as ever in the past. We need to be on guard against indiscreet friends, as well as quacks.

Please send us samples of what you say or print on the subject.

Hygeia, March, 1937—Published at 535 N. Dearborn St., Chicago, Ill., at *25 cents* a copy:

Health in the flood area (Louisville) . . . Diphtheria: unnecessary death . . Curious stories about health . . . It's the way you walk (posture) . . . Be kind to animals? (animal experimentation) . . . "Just another accident" (murder by automobile) . . . Syphilis . . . Safety and sanitation news pictures . . . Live with your heart—and like it! . . . Suggested activities for persons with impaired health or physical handicaps . . . Miss Fanny's tea room (play) . . . The milky way (pictures) . . . The doctor in France . . . Death to disease (the U. S. Public Health Service) . . . Traps and contraptions for the gullible (freak patients) . . . Nature's G-men (nature's forces for health) . . . Moral codes and health habits . . . Pierre Paul Emile Roux (France, 1853–1933) "who banished death from diphtheria" . . . Physical treatment of arthritis . . . The neighbors lend a hand (in home hygiene) . . . Every mural has a moral (picturing a health exhibit in which every letter is a capital letter) . . . Questions and answers . . . New books on health.

In "School and Health" conducted by J. Mace Andress, 67 Clyde St., Newtonville, Mass.:

The challenge of leisure in adolescent education . . . Accident facts and safety teaching . . . The choosing of Byrd's crew (teaching material) . . . Planning a unit on sleep and rest (Syracuse) . . .

For Junior and Senior High Schools—"Preventing Tuberculosis" is a teaching unit for junior and senior high schools. Published by National Tuberculosis Association, and available through all state tuberculosis associations.

"To the Teacher" says:

This unit is offered by the National Tuberculosis Association in answer to a country-wide demand from state and local tuberculosis organizations for teaching material to be used in schools to prepare pupils psychologically for the tuberculin test. It is believed that such a teaching plan will increase parents' coöperation and at the same time give pupils a sound educational background which will guard against fear of tuberculosis and an overly "health conscious" attitude.

There are two series of multiple choice tests, for junior and for senior high schools, of which this is a sample:

Tuberculosis is a disease which is most common among:

—small children
—young people (correct)
—older people

The study material is offered as 5 problems or questions, under each of which are suggested "activities," and "basic subject matter for the teacher."

What Are They? Are They Different?—We use quite freely whatever title or phrase catches the public fancy, or our own idea of something new or different. For some words almost any

meaning may go. The original use is elastic and may be applied widely. Other terms have certain technical, or at least specific meanings. It seems a pity to distort them, particularly when we may bring confusion to some minds.

We have conferences, study groups, institutes, seminars. Are they different words for the same meaning? We think not. We think that each should be respected for its own meaning and its own specific use. "Seminar" comes to us with a rich background of what we should have at times in our study of health education. But have we yet brought together a group which might rightly claim seminar status? May we look forward to its use in the old, university sense? In the meantime should we not avoid "seminar" when there is no seminar?

DATES AHEAD

April 24-May 1: Boys' and Girls' Week

April 25-May 2: Better Homes Week

May 1: Moving Day (health elements to look for)

May 1: May Day–Child Health Day

May 9: Mothers' Day. Better than flowers for mothers are adequate health and maternal care. See Maternity Center Assn., 1 E. 57th St., New York, N. Y., for plans and materials.

May 12: National Hospital Day. See "National Hospital Day," by A. G. Hahn. *Hospitals*, 18 E. Division St., Chicago, Ill. March, 1937. Includes proclamation for the mayor; paragraphs for radio announcers; and list of state chairmen who will welcome coöperation.

May 12: Birthday of Florence Nightingale

May 21: First Red Cross Society in U. S. Started in 1881

Suggestions for use of above dates will be found in *News Almanac for Social Work* and *Almanac for Social Work*. Community Chests & Councils, 155 E. 44th St., New York, N. Y. *60 cents*.

In April, Junior Red Cross members are scheduled to learn Red Cross water safety rules, to help provide safeguards for swimming pools, to form first aid teams, to learn precautions against food poisoning, etc.

The dates for general observance of National Negro Health Week are now past, but the celebration will come later in many communities. For plans and materials write to National Negro Health Week Committee, U. S. Public Health Service, Washington, D. C. Also ask for *National Negro Health News*, issued quarterly through the year.

"Enlistment Week," is past for the Women's Field Army of American Society for the Control of Cancer, but the Army continues its activities. For details address the Society, at 1250 6th Ave., New York, N. Y.

EDUCATION—TECHNIC

The Health Officer, U. S. Public Health Service, Washington, D. C., for Feb., 1937, includes:

National conferences on college hygiene . . . Public health education in a county health unit (Nez Perce, Idaho) . . . Detroit fights tuberculosis . . . Some techniques in the national health education of the adolescent (C. Ward Crampton) . . . What's wrong with health education . . . Book reviews (see "Educational Paths to Virtue," and "Mother and Baby Care in Pictures") . . . News briefs (includes health education paragraphs).

If you wish to see how a high school poster contest is handled write to Henry Street Visiting Nurse Service, 99 Park Ave., New York, N. Y.

"Now it can be shown" is an 8 page pamphlet illustrating the Vienna type of pictorial graphics as produced

by *Pictorial Statistics,* 22 E. 40th St., New York, N. Y. *Free.*

"Organizing a Regional Conference on Social Hygiene," by J. A. Goldberg. *Journal of Social Hygiene,* 50 W. 50th St., New York, N. Y. Oct., 1936. *35 cents.* How it was done in New York City, but is likely to point the way for other communities. In same issue are programs of kindred extensive conferences held in St. Louis, Buffalo, and Syracuse.

"Social Work Interpretation," by M. S. Routzahn. Russell Sage Foundation, 130 E. 22d St., New York, N. Y. *10 cents.* The latest bibliography covering such topics, as, Public opinion . . . The newspaper . . . Writing . . . Radio . . . Meetings and speaking. Broadly related to social work, with specific references to health material, and much application possible to health education.

Ten of 48 pages in "Cooperatives" are pictographs. This pamphlet is an effective example of presenting the main arguments pictorially, supplemented by clearly written text. Paper, *25 cents;* boards, *35 cents.* Foreign Policy Assn., 8 W. 40th St., New York, N. Y.

To understand health education work among young women and the Y.W.C.A., you may wish to look up articles in *Womans Press,* 600 Lexington Ave., New York, N. Y. *20 cents.* In the March, 1937, issue: "The Health Education Secretary as a Group Worker," "Health Educator — Her Majors and Minors."

HEALTH EDUCATION

Health Education Outlined — Every 2 years the *Social Work Year Book* (Russell Sage Foundation, 130 E. 22d St., New York, N. Y.) seeks to interpret all of the forms of social and health work, and related interests, to the professional and volunteer workers in the varied fields of interest.

The adult or popular health education article in the 1937 edition was prepared by Raymond S. Patterson. Here is Part I of the article:

Health Education, in its broadest sense, is the sum of all experiences which influence habits, attitudes, and knowledge relating to individual and community health. For the purposes of this article, however, the term is limited to such activities as are deliberately directed toward these objectives. This usage does not imply that health education is an administrative entity; on the contrary, it connotes a broad program in which all health workers are expected to take an active and intelligent part. Almost every contact of health officials and voluntary health workers with individuals or groups of people present opportunities for health education. Although completely staffed health agencies employ specialists to plan and administer the educational program, that program fails of its widest usefulness unless all staff members participate in it. For a discussion of health education as related to school children, *see* School Health Work.

The work of the health educator includes some or all of the following activities: (a) enhancing the educational values of public clinics and other public health services; (b) interviewing individuals and arranging group meetings; (c) preparing, or obtaining from other sources, educational media supplementary to personal interviews and group meetings.

These media include news items, bulletins, booklets, radio talks, movies, and exhibits. An effective program of individual instruction, group contacts, and general propaganda calls for a succession of timely projects formalized in a campaign calendar.

Participating Agencies

Health education is now acknowledged to be an integral part of any official or governmental health program. What was in the past considered largely the province of the private health agency is now accepted as a public responsibility. Leaders in public hygiene now agree that some official health worker should assume the central rôle in formulating and administering the community's health educational program. Whether the public health officer himself, or a public health nurse, or a health educator undertakes this task depends upon community resources. Formation of health educational councils are favored in which representatives of the city health de-

partment and other social agencies may meet to formulate a common program to correlate the educational work of all. Variations of the health council plan are found in associations of outpatient departments, divisions of councils of social agencies, and the like. Whatever the form, the trend is definitely toward effective coöperation of official and voluntary educational efforts. *See* Public Health Agencies, Voluntary.

Local public agencies are frequently assisted in their educational programs by state health and welfare departments. Administrative practice in this respect is uneven; in some states the educational divisions of the state departments have made outstanding contributions, while in others little has been done. A notable achievement in this area is the radio "health play" program of the New York State Department of Health. A continuing series of radio plays is being written, directed, acted, and transcribed by members of the department; these plays are given over a local radio station, where electrical transcriptions are produced for distribution to other broadcasting stations; and later these records are offered to local health workers in much the same manner as are motion pictures. Limitations of space prevent the description of pioneering efforts of other states, though many are noteworthy.

The outstanding development in official participation in health education was the formation in 1936 of the Office of Public Health Education in the United States Public Health Service. The functions of this new office, in addition to the education of professional workers, include research in educational methods, experiments in mass education, and the preparation of educational material. Under the provisions of the federal Social Security Act, other departments of the national government—notably the Children's Bureau—are augmenting or devedoping similar services. *See* Public Health Organization, Governmental.

Health education more than any other health service requires the effective coöperation of voluntary organizations with official agencies, both locally and nationally. Each year sees a closer coördination between the official agencies and the nonofficial groups. Among the voluntary agencies themselves many local and state medical societies have appointed committees to further the participation of the medical profession in public health. Some of these committees have full-time professional staffs, carrying on ambitious educational projects. The Bureau of Health and Public Instruction of the American Medical Association has grown markedly, and in addition to assisting local and state medical associations, carries on independently a nation-wide program of radio broadcasts. Such effective participation of organized medicine in health education is of inestimable value to public hygiene.

The public health nurse who visits the sick in their homes, attends public clinics, or meets groups of adults, has perhaps the one best opportunity to influence the health habits, attitudes, and knowledge of individuals. That the public health nurse may make fullest use of this opportunity to serve as health educator is one of the aims of the National Organization for Public Health Nursing. *See* Public Health Nursing. Tuberculosis associations—local, state, and national—have been pioneers in health education, and enjoy an enviable record of coöperation with official and with other voluntary health organizations. As public agencies extend their provisions for finding and caring for tuberculous patients, the tuberculosis associations are enabled to concentrate their funds and efforts on direct health education. The ever-expanding educational program of the National Tuberculosis Association now includes pioneering projects in the field of health exhibits, in which a renewed interest is being taken by many agencies. *See* Tuberculosis. The educational programs of other national health agencies have also shown a healthy expansion, and still other agencies, though concerned primarily with fields apart from health education, contribute to it. An outstanding example of the latter is the American Red Cross whose instructional projects in home hygiene, first-aid, nutrition, pellagra control, and the like, are essentially contributions to health education. The National Health Council's recent "town meeting" program was a joint effort of voluntary health agencies to stimulate official bodies to interest influential citizens in improving public health. The project was undertaken in 50 or more municipalities with varying degrees of success, reflecting the enthusiasm and effort of the local leaders.

Though commercial organizations have much to contribute to the field of health education, their entrance into it presents problems to the health educator. They produce excellent educational material, but the possibility of their offering thinly veiled propaganda, masquerading as education, is one against which the health administrator must guard.

Health Education in Illinois—The Department of Public Health, State of Illinois, for 1935–1936, gives 3 pages to Division of Public Health Instruction, B. K. Richardson, Chief. The opening paragraph says:

> The editing and publication of an attractive booklet on infant care which has proved to be exceedingly popular, the compilation and publication of two special statistical bulletins that relate in detail to fundamental health problems in the political units of the state, the promotion of Town Hall meetings on health in 8 municipalities, the management of the annual conference of Illinois health officers and public health nurses and the development and execution of plans for exhibits displayed at the State Fair, State Medical Society meeting and at other places are among the principal extra-routine features of work undertaken and accomplished by the division during the year. The routine activities include the publication of the bi-weekly bulletin of the department, *Illinois Health Messenger*, each issue of which reaches 25,000 people, the preparation of copy for the press, the preparation and release of a weekly and bi-weekly statistical bulletin for public health workers, the management of radio programs over 4 stations, the editing and publication of the annual report of the department, the preparation of special articles for various public health and medical journals, and the editing and publication of literature prepared for general distribution by the department.

The Division of Sanitary Engineering needs a page, under 3 sub-heads, to tell of its educational work.

Vital statistics tells of an exhibit at the State Fair.

Division of Dental Health Education has nearly 2 pages.

Division of Child Hygiene and Public Health Nursing, which "is basically educational in character," has 3½ pages.

Notwithstanding the above record of extensive health educational activity, the showing in the index is limited to—

Health education	9, 11
Health Messenger	12

Elsewhere are references under Dental health education; Educational work (sanitary engineering division); Public health instruction; Radio broadcasting programs; and Town Hall meetings.

How much better for the student and research worker, and public health educator, if all references had been included under health education!

Health Education in Public Health—Not all of the books which review the whole of present-day public health include a recognition of public health education as an accepted phase of public health administration or public health activity. In *An Introduction to Public Health*, by Harry S. Mustard of Johns Hopkins University, we do find that recognition.

Under "Organization and Administration" we find 2 pages in which health education, its possible audiences, and methods of approach are described. There are some practical suggestions, positive and negative.

There is nearly a page outlining "What the general public should be taught about tuberculosis," and ½ page outlining "what the public should be taught about cancer." The index reference to health education on page 163 is a mistake. Published by Macmillan Company, 60 5th Ave., New York, N. Y. *$2.50.*

HEALTH PERIODICALS

Cleanliness seems to have fared better in England during the depression than in the United States. The *Occasional Bulletin* of Health and Cleanliness Council has from time to time indicated numerous and varied activities without apparent let-up during many years. Printed matter, dramatic material, and graphic devices are offered by the Council at 5, Tavistock Square. London, W. C. 1.

Everybody's Health, 11 W. Summit Ave., St. Paul, Minn. The November, 1936, number was a "10th Annual

Milk Issue," with large size pictures and text. *10 cents.*

The industrious collection of opinion and news relating to one phase of public health administration is illustrated by the contents of *Health Officers News Digest,* Public Health Committee of the Cup and Container Institute, 30 Rockefeller Plaza, New York, N. Y.

National Health Review, Ottawa, Ontario. Oct., 1936. Devoted wholly to a report of Sub-committee on Nutrition of the Canadian Preparatory Committee, British Commonwealth Scientific Conference.

Neighborhood Health, New York City Dept. of Health, for March, 1937, is a nutrition issue. "On Guard!" tells how the Department guards the food supply. "You have received information about food and nutrition at the Health Centers of the Department of Health. Has this information helped you?" Seven housewives answer, a small photograph of each is shown—they are American Indian, Chinese, Puerto Rican, Negro, Jewish, Irish, and Czechoslovakian. Other food or nutrition material, and two sketches are included.

Of the bulletins or house organs intended for the local workers the newsiest and most informative which reaches us is probably *Flashes,* issued by the Tuberculosis and Public Health Committee, State Charities Aid Association, 105 E. 22d St., New York, N. Y. In honor of this special event, for just this once, we mention the full name of the organization. The cover is printed, with date, number of issue, and main contents mimeographed. The cover sheet is double letter size, so that the mimeographed text pages are slipped inside and then stapled. The editor is Marie Warner Anderson; the artist, Mae E. Moran.

Public Health News, State Dept. of Health, Trenton, N. J., is now issued bi-monthly.

MAGAZINES

"Are We a Nation of Prudes?" Page editorial. *Collier's.* Feb. 6, 1937.

Today we talk frankly enough about many intimate personal problems which would have shocked our grandparents. Although we are a sophisticated people, when it comes to a question like syphilis, we are still a nation of prudes.

"Foot Notes for the Family Feet." What happens as the "average" American "trudges through life for a total of 65,000 miles." *Literary Digest,* 354 4th Ave., New York, N. Y. Feb. 27, 1937. *10 cents.*

"The Forgotten Family Remembered," by I. M. Havey. *Red Cross Courier,* Washington, D. C., Feb., 1937. *10 cents.* Starts with the incredible picture of hospital nursing before Bellevue began training nurses, and traces the steps in the development of Red Cross nursing services.

"Germ-killing Lamp Preserves Food: Mold eliminated, meat tenderized by ultra-violet death rays." *Literary Digest.* March 6, 1937. *10 cents.*

"Here's Looking through You," by H. Lees. *Collier's.* Feb. 20, 1937. "Nowadays, at the slightest provocation, an X-ray specialist will take pictures of brain, gall bladder, or a lung."

In *Reader's Digest,* Pleasantville, N. Y. (March, 1937: *25 cents*): "Where Do We Get Our Prejudices" (from *Harper's*); "Combating Early Syphilis"; "It's Safer to Go to Work"; "Hospital Hospitality" (which may suggest to some readers how clinics, health department entrance offices, etc., may be made more "hospitable"); "Mother Nature Knows Best" (*Virginia Quarterly Review*), animal health practices.

"Protective Foods for the Family," by M. H. Irwin. *National Parent-Teacher,* 1201 16th St., N. W., Washington, D. C. March, 1937. *15 cents.*

"Purity Preferred," by V. G. Heiser,

M.D. *Collier's.* March 13, 1937. Why a health department, and what it does.

"Stop This Slaughter"; "Reckless Drivers"; "The Cost of Being Careless"; "Drive Slow!!!"; "These Children Are Too Young to Die"; "Stop, Look and Live"; "Be Smart and Live." Seven pages of safety pictures, plus 2 pages of child labor pictures. The newest picture magazine, *Look,* Des Moines, Iowa. April, 1937. *10 cents.*

"U. S. Science Wars against an Unknown Enemy: Cancer"; 8 pages in *Life,* 350 E. 22d St., Chicago, Ill. March 1, 1937. *10 cents.*

"Victor Heiser, M.D." An interview and a portrait in *Junior League Magazine,* 305 Park Ave., New York, N. Y. March, 1937. *30 cents.* Here is how his book was written:

> How could anyone turn out a thousand-page best seller, dealing with public health in 45 countries, in a month, we asked? Actually, he said, the material for the book was gathered over a period of 20 years.
>
> "You see," he explained, "when I was a very young doctor in the young field of public health, I traveled in many out-of-the-way places. I love a good story, and I picked up a number of unusual ones which I used to tell my friends. They advised me to keep a written record of my experiences, so I began noting them down in a diary. After I retired as director of the International Health Division of Rockefeller Foundation 2 years ago, my friends urged me to publish my experiences, and I actually started the book. Fortunately I found just the right person to sit behind a screen in my study and take down verbatim the tales I told my friends. At the end of the day, the stories which had been taken down were checked with my diary for actual dates and chronological order. It was very satisfying to me to read one reviewer's opinion of my book in which he said that reading it was like listening to a series of fireside chats; because that is exactly how the book was written."

"Who Taught You to Drive?," by T. R. Carskadon. *Collier's.* March 6, 1937. Millions really don't know how to drive the car they handle; a one man campaign for better drivers.

MOTION PICTURES

"Further Experience in Movie Making," by E. G. Sargent. *Public Health Nursing,* 50 W. 50th St., New York N. Y. Oct., 1936. Another in a series of articles on movie making by nursing groups. In this case a low cost professional photographer was employed. The scenes are described. Reprint of the series, *15 cents.*

The Journal of Social Hygiene reports a new French film on gonorrhea.

More than 200 copies of "Behind the Shadows" were sold in 4 months.

Movie Makers (420 Lexington Ave., New York, N. Y.) notes that

> A complete training course in the duties of a midwife is one of the subjects most recently treated in 16mm. film by Dr. G. H. Gunn, medical health officer of the Public Health Department of Durban, South Africa. He reports that this film has been of the greatest use in teaching practical methods to uncertificated, non-European midwives, mainly Asiatics, who serve the large Indian population of Durban. It is the department's intention to add sound on the film to this picture in the near future. Other subjects produced under Dr. Gunn's direction, with Lynn Acutt handling the photography, have been films on anti-plague sanitation, anti-mosquito sanitation, milk supply, water supply, town cleansing and health culture.

The Sacramento Tuberculosis Assn., as reported in *News Letter* (Calif. Tuberculosis Assn., 45 2d St., San Francisco) has made—

> An interesting 16mm. silent film of the tuberculin testing survey of the Senior High School. Used before clubs and other groups. The film is winning greater interest and enthusiasm for surveys throughout the county. The picture, entitled "The Value of Tuberculin Testing," is enlivened with a story which is carried through the film. If you should consider producing a film picturing the work of your association, we suggest you write Estella S. Edson, Executive Secretary, and get from her the details of her experience in this line.

"Selected Motion Pictures: 1936–1937" lists some health pictures available through the Motion Picture Bureau, National Council Y.M.C.A., in New York, Chicago, and Portland, Ore. Get list from 347 Madison Ave., New York, N. Y.

School Movie Making—A Brooklyn school has illustrated the idea this department has been urging — that schools be enlisted in health movie making. *Bulletin* of National Tuberculosis Assn. (Feb., 1937) tells the story, and raises a question at the end of this quotation:

An ambitious biology club of a Brooklyn school is working on an amateur movie based on Trudeau's Autobiography. This is an admirable undertaking, valuable not only to interest young people in tuberculosis, but also later to instruct many others. Are there not movie enthusiasts in your community who might be inspired to photograph a story based on points of local interest or on some outstanding personality who has contributed to the movement? Is there, perhaps, a recovered patient in your town whose experiences could be narrated on celluloid? Amateur movie making is a fine class project calling for integration of history, biology, art, dramatic, and English courses. Of course such a project must be ably led. Making a movie is not child's play. Would you be interested in an amateur movie league specializing in health pictures? If so, write the Health Education Service.

PROFESSIONAL TRAINING

"Suggestions for a Staff Program for the Study of Maternal Welfare." One of a series. *Public Health Nursing*, 50 W. 50th St., New York, N. Y. Feb., 1937. *35 cents.*

Institute for Tuberculosis Workers, June 14–26, 1937, University of Southern California, Los Angeles, Philip P. Jacobs, conductor. Address a state tuberculosis association, or the conductor in care of National Tuberculosis Assn., 50 W. 50th St., New York, N. Y. Will include educational methods and child health education.

A Summer Course in Public Health Education—The Rutgers University course in 1936, led by C. K. Blanchard, 6 hours:

A. Content of health education; what to teach in personal hygiene and community sanitation and hygiene; pedagogical methods.
B. Verbal instruction of groups and individuals; principles of public speaking.
Exercise—preparation of lecture outline.
C. Informational pamphlets; what to include; methods of preparation, distribution of printed matter.
Exercise—preparation of sample leaflet.
D. Bulletins and reports; what to include, preparation and distribution; study of sample periodicals.
E. Newspaper informational publicity; what is news, how to prepare material, how to get matter printed.

RADIO

The National Tuberculosis Association is planning the production of electrical radio transcriptions.

Public Health News, New Jersey Department of Health, Trenton, reports on radio activity:

The Hudson County Board of Health and Vital Statistics conducts the "Radio Health Forum" in Jersey City. According to the fan letters received, the radio is an excellent medium of spreading health measures.

The Hudson County Medical Society also recently established a broadcast patterned after the "Radio Health Forum."

The program of presentation consists of a few introductory remarks by the program conductor and then a talk of from 8 to 9 minutes by some person interested in health promotion on some phase of a condition or disease to which humans are susceptible. There have been many interesting talks given on personal and public health. In addition to the regular talks, immunization against diphtheria for all children has been stressed, and several skits have been dramatized, demonstrating health activities.

If any department of health in the state desires service or assistance to arrange the inauguration of similar health broadcasts please write to Hudson County Board of Health and Vital Statistics, Harry F. Downes, Statistician and Radio Director.

"Radio Broadcasting Bibliography"

(to Jan., 1937). Titles are grouped under "General"; "Broadcasting Technique"; "Foreign Broadcasting"; "Publications of CBS"; "Publications of NBC"; etc. *Free* of Columbia Broadcasting System, 485 Madison Ave., New York, N. Y.

"Radio Forum on Growth and Development of the Child" is conducted under the joint auspices of the National Congress of Parents and Teachers, the American Academy of Pediatrics, and the National Broadcasting Co. For announcement of the series starting last October, write to N.B.C., 30 Rockefeller Plaza, New York, N. Y. Given Wednesdays, 4:00 to 4:30 p. m., E.S.T., over Blue Network of NBC. The closing sessions will be as follows:

April 14: "Disease and the Doctor's Side of Growth," by Joseph Brennemann, Chief of Staff, Children's Memorial Hospital, Chicago, Ill.

April 21: "The Effects of Family Income on a Child's Growth," by Martha M. Eliot, Assistant Chief, Children's Bureau, U. S. Department of Labor.

April 28: "The Effect of Child Labor on Growth," by Richard A. Bolt, Director, Cleveland Child Health Assn.; Lecturer, University of California.

May 5: "Growth of Children During Wars and Depressions," by Carroll E. Palmer, Medical Officer in Charge of Child Hygiene Investigations, U. S. Public Health Service.

May 12: "Health Hazards in the Period of Growth," by Louis I. Dublin, Vice-President and Statistician, Metropolitan Life Insurance Company.

May 19: "Old and New Thoughts About Growth," by Henry E. Sigerist, Professor of History of Medicine, Johns Hopkins University School of Medicine.

To insure the local broadcast of a network program health agencies should announce the program to local groups interested in the subject matter. The local stations are far more likely to broadcast the program if these local groups urge the stations to do so. Be sure to get into action as early as possible. There have been keen disappointments when local broadcasts have been taken for granted, and local groups failed to express their interest in advance.

You Can't Get Time On the Air?—What health department or other health agency cannot get time through a local broadcasting station? Or, cannot get time at an hour which seems worth the effort demanded by a good job of broadcasting?

The facts as to lack of opportunities may clarify discussion of the subject.

As Members of Radio Audiences—Time and again representatives of broadcasting companies emphasize their responsiveness to their audiences.

This fact seems to point to activity in getting listeners to register their approval or disapproval of health broadcasts. Health workers first, as radio listeners. Then follow with club discussions and requests for letters or postal cards, and for resolutions, too. Results depend upon how much we and others are truly interested in health broadcasting.

REFERENCE—EDUCATION

"About Tuberculosis." John Hancock Mutual Life Insurance Co., Boston, Mass. *Free.* Cover and 16 pages.

"Avoid Influenza: If You See a Fellow with a Cold, Run, or Your Nose Will Run Later." State Dept. of Health, Hartford, Conn. One page. How to protect yourself; how to protect others.

"Combating Early Syphilis," by Dr. J. H. Stokes, is another *Reader's Digest* venture. In March, 1937, issue; 6 pages; reprints, *$1.00* a hundred. Address: Pleasantville, N. Y. A foreword by Dr. Parran says:

Dr. Stokes' contribution contains information that is absolutely essential to the success of our campaign; a thoughtful reading of

the article should enable the layman to understand what can and must be done by the private physician and his patient in controlling the disease.

"Common Colds." State Dept. of Public Health, Springfield, Ill. Symptoms, causes, control.

"A Directory of Organizations in the Field of Public Administration—1936" (Public Administration Clearing House, 850 E. 58th St., Chicago, Ill. 180 pages. $1.00) is a source of information for many who write and plan. It includes a list of national organizations; classification of the nationals by fields of activity; state, regional, and Canadian organizations. For the executive, the health educator, and other staff members.

"The Doctor of Tomorrow," by Dwight Anderson. Reprint. Medical Society of State of New York, 2 E. 103d St., New York, N. Y. *Free.* A presentation of the idea that a doctor will serve the people even though the state sets conditions which make it difficult for him to do so.

"The Expectant Mother" is a new 10 page folder on maternal care issued by U. S. Children's Bureau, Washington, D. C. Single copies *free.*

"Handbook on the Nursing Care of Pneumonia," and "Suggestions to the Family for the Home Care of a Pneumonia Patient" (stiff paper folder). State Dept. of Health, Albany, N. Y.

"Home Care of Communicable Diseases." John Hancock Mutual Life Insurance Co., Boston, Mass. *Free.* With a double page chart showing time exposure to first sign, early signs, time to observe exposed children, and so on.

"Our Nurses." A 28 page pamphlet issued by Advisory Committee on Nursing, Room 210, 105 E. 22d St., New York, N. Y. On left-hand pages: a description of a service, with several paragraphs indicating the present status or extent of the service, including prenatal, infant welfare, preschool, school, etc. On the right-hand page: a case story; "Babies Welcome," "Jimmy Lasky," "Marie Antonini," etc.

"Pertinent Facts About Syphilis." State Dept. of Public Health, Springfield, Ill. Mimeographed.

A series of short articles on measles and scarlet fever are offered by the "Health Reporter" of Health News Service, 22 E. 40th St., New York, N. Y.

"State and Local Social Hygiene Societies in the United States"; National agencies with departments, committees, etc., concerned with social hygiene; United States official agencies having to do with social hygiene. Lists in *Journal of Social Hygiene,* 50 W. 50th St., New York, N. Y. Oct., 1936. *35 cents.*

The study program for board and committee members continues through issues of *Public Health Nursing,* 50 W. 50th St., New York, N. Y. In Dec., 1936, were outlines on U. S. Public Health Service, U. S. Children's Bureau, and Office of Indian Affairs.

"A Summer Camp for Diabetic Children." Much detail as to the condition of the children as well as camp management; forms; recommendations for the future. New York Diabetes Assn., 386 4th Ave., New York, N. Y. *Free.*

The U. S. Public Health Service has announced that proceedings of the First National Conference on Venereal Disease Control Work has been published as Supplement No. 3 to *Venereal Disease Information,* Supt. of Documents, Washington, D. C. 154 pages. *15 cents.*

"Waistlines," by Dr. W. W. Bauer. An overweight pamphlet of 20 pages. "Nature seems to have decreed that longer life lines shall go with shorter waistlines"; and what to do about it. John Hancock Life Insurance Co., Boston, Mass. *Free.*

"Watch Your Diet," by E. M. Geraghty. American Medical Assn., 535 N. Dearborn St., Chicago, Ill. *10 cents.* "For those whose weight is normal."

Reprints from Children's Bureau, Washington, D. C.:

A Study of 244 Prematurely Born Infants . . . Progress in Maternal and Child Welfare Under the Social Security Act . . . Public Health Nursing in Programs for Crippled Children . . . A Statistical Study of Stillbirths in Hospitals . . . The Trend of Child Labor in 1936 . . . a group of articles on Social Security Services for Mothers and Children.

From Committee on Tuberculosis and Public Health, SCAA, 105 E. 22d St., New York, N. Y.:

Putting Our Knowledge of Tuberculosis to Work Through the Public Health Agencies, by Homer Folks (*Free*) . . . Continuity and Growth of the State Department of Health, by Homer Folks (*4 cents*) . . . The Modern Background of Syphilis Control, by Dr. J. E. Moore (*3 cents*) . . . Routing Tuberculosis from Its Last Strongholds Among Workers, by Amberson, Greenberg, and Winslow (*10 cents*).

Reprints from *Public Health Nursing*, 50 W. 50th St., New York, N. Y., at *10 cents* each:

Industrial Nursing Pays . . . The Nurse in Pneumonia Control . . . Nurse-Teacher Rapport . . . The School in a Community Health Council . . . Volunteers for Mothers' Clubs.

Study Program for Board and Committee Members: The U. S. Public Health Service . . . The N.O.P.H.N.

Programs for Staff Education: Maternal Welfare

SAFETY

If your responsibilities or opportunities touch mining regions you will wish to receive *New Publications,* U. S. Bureau of Mines, Washington, D. C. *Free.*

"Reducing Fire Accidents in Homes," by T. A. Fleming. *National Parent-Teacher Magazine,* 1201 16th St., N. W., Washington, D. C. Aug., 1936. *15 cents.*

"Safety in Pupil Transportation." Equipment, drivers, tests, etc., etc. *Research Bulletin,* National Education Assn., 1201 16th St., N. W., Washington, D. C. Nov., 1936. *25 cents.*

"Falls and How to Take Them," by C. L. Bryant. *Red Cross Courier,* Washington, D. C. Jan., 1937. *Free.*

"A Hunt for Hazards in the Home," by A. W. Knight. *Red Cross Courier.* Dec., 1936. School children seek accident causes.

"Policing the Medicine Cabinet," by B. France, tells how to avoid unsafe practices in the home collection of medicines and emergency materials; "The How, What, When, and Why of School Children's Accidents," by J. M. Pinckney, analyzes such accidents, and includes an outline of a boy's body with figures on accidents by parts of the body. A useful device for reaching adults as well. In *Safety Education,* 1 Park Ave., New York, N. Y. Jan., 1937. *10 cents.*

"Safeguarding the Eyes of Children: a Pictorial Review." *Sight-Saving Review,* 50 W. 50th St., New York, N. Y. Sept., 1936. *50 cents.* One of a series of pictorial presentations.

"The Safe Way All Day," by C. Towle. *Safety Education.* March, 1937. A children's pantomime in 5 scenes. A desirable element in this outline is that the main idea only need be stated, and then the children may work out the detailed action.

"Sight Conservation as an Educational Problem," by R. S. French. *Sight-Saving Review.* Sept., 1936. *50 cents.* "More than ever, educators are using motion pictures, slides and other visual aids in carrying out their work. This trend alone necessitates an added interest in a school eye health program."

"You Bet Your Life! A Review

of America's Shameful Automobile Accident Record." Travelers Insurance Co., Hartford, Conn. *Free.* The seventh in a series of annual publications, each a scrapbook of statistics, cartoons, and striking illustration. In the 1937 edition the hazards of traffic are compared with some forms of gambling.

"Fun with Facts" is a 32 page booklet setting up a number of simple, but interesting experiments and entertaining problems. These give opportunities for testing personal reactions, and to observe the workings of certain physical laws. All of the answers are tied to automobile accident possibilities. Try them on young people and adults. Travelers Insurance Co., Hartford, Conn. *Free.* There is material for illustrated talks before Rotary and other audiences. Teachers, club leaders, scout masters, and others should be able to make good use of this material.

PLAYS AND PUPPETS

"Exit the Monster," by A. C. Gilmore. American Medical Assn., 535 N. Dearborn St., Chicago, Ill. *10 cents.* A play for children and adults, introduces Edward Jenner.

"Health Plays for School Use." School Health Education Service, 1201 16th St., N. W., Washington, D. C. Revised. *Free.* List of play sources, references on technic of production; and a foreword, which follows, which should be quoted widely by those who are dealing with teachers:

> Dramatic expression is so congenial to children that it is natural for the teacher to have faith in a lesson cast in such a form.
>
> It is important that the lesson in play form be not only truly imaginative, but also that its factual content ring true, and that the action have, inherent in it, real dramatic possibilities. In selecting the health plays here listed, an effort has been made to choose those most naturally childlike, most naturally dramatic.
>
> Teachers should remember, however, that the richest vein of dramatic possibilities for learning always lies in the child himself—especially in the little child. His original dramatic expression, in words and action, of an idea that is clearly presented to him and that has become thoroughly familiar, will always have greater educational value than any dramatic activity prearranged for him.

"How to Make and Operate Marionette and Puppet Shows," by M. Wagner. A. S. Boyle Co., 1934 Dana Ave., Cincinnati, Ohio. *Free.* In 28 pages, with numerous illustrations, are practically complete instructions for building a puppet show. In this case puppets are made from plastic wood.

"Looking Back," public health nursing of 25 years ago, and "Then—and Now," the nurse in a milk dispensary of the same period. Two plays for adult audiences. National Organization for Public Health Nursing. 50 W. 50th St., New York, N. Y. *3 cents.*

"Puppetry Bulletin: 1936–1937," by Paul McPharlin, Birmingham, Mich. *Free.* A source of information as to new publications and new materials for those who use puppets for teaching or just for fun.

Capital Letters Are Hard to Read—Long ago advertising psychologists tested and proved that capital letters are hard to read. In other words, every letter capitalized in the word or sentence to emphasize its importance actually reduces its legibility.

The other day we saw two striking displays put up by a health department. All letters were capital letters. All capital letters were hard to read.

Most road signs are in all caps—and so they are harder to read than if lower case were used. Make lower case letters as large as the caps, and they will be as easily seen, and more easily read.

BOOKS AND REPORTS

Books of Special Interest to Public Health Workers

MAZÝCK P. RAVENEL, M.D.

OUR review of books on public health presented last year was received with sufficient enthusiasm by our readers to warrant repeating the survey this year.

The following recommendations and comments upon books published during 1936 are based chiefly on reviews in our *Journal*. The *British Medical Journal*, *The Lancet*, the *Journal of the American Medical Association*, and other magazines have been consulted; but it must be borne in mind that we avoid books on clinical subjects because our primary interest is public health.

HOUSING AND NUTRITION

APART from what might be called local manifestations of disease, such as poliomyelitis, in several of our states, we believe that housing and nutrition have attracted more attention than other branches of public health. As regards foods, there have been many papers on the subject, but few good books have come to us, and of those some have been of the nature of propaganda rather than substantial works. We except, of course, some of the standard books which have come out in new editions, and are still our best guides. A useful book for reference is *Foods and Beverage Analyses*, by Milton A. Bridges, Lea and Febiger. This gives the mineral content of more than 440 foods and tables showing the iodine content. A large part of the book is devoted to vitamins. It ends with an extensive bibliography running up to July, 1935. A second book, which is propaganda and contains a great deal that is useful, though put in a way which is not entirely pleasing to the scientific man, is *American Chamber of Horrors*, by Ruth deForest Lamb, Farrar and Rinehart, in which the Food and Drug Administration took some part. *The Problem of Nutrition, Vol. I*, Interim Report of the Mixed Committee on the Problem of Nutrition, should be mentioned here as an excellent review of the principles of nutrition, Geneva, 1936, League of Nations, Distributed by World Peace Foundation.

PUBLIC HEALTH NURSING

NURSING generally, and public health nursing especially, continues to attract increasing attention, and it seems safe to say that public health workers as well as administrators are recognizing more and more the importance of the public health nurse in carrying out their general program. Two substantial books have appeared. *Textbook of Attendant Nursing*, by Katherine Shepard and Charles H. Lawrence, Macmillan. The authors have had 17 years' experience in teaching. It has especial value in supporting the teaching of this branch of nursing in special schools rather than making it a by-product of schools of nursing. *Public Health Nursing*, by Mary Sewall Gardner, Macmillan, which has now reached its 3rd edition, has been from

the first the only text of its kind in the field. The new edition maintains the high standard set by its predecessors.

INDUSTRIAL MEDICINE

THE revival of industry along so many lines brings knowledge of industrial medicine to the front. *Industrial Medicine,* by W. Irving Clark and Philip Drinker, National Medical Book Company, is especially strong on the occupational diseases. It goes quite extensively into pneumonoconiosis. This condition to which much attention has been directed by the terrible experience in West Virginia and the racket of suits against employers, is further treated of in *The Pneumonokonioses (Silicosis): Literature and Laws of 1934,* by G. G. Davis, E. M. Salmonsen, and J. L. Earlywine, Chicago Medical Press. *Injury and Incapacity,* by H. Ernest Griffiths, Wood, was written with especial reference to industrial insurance, and as it is an English book, is particularly applicable to conditions in Great Britain. It is, however, considered by experts an "indispensable volume" to those interested in this subject. *Industrial Dust,* by Philip Drinker and Theodore Hatch, McGraw-Hill, is based on a bibliography rich in material, both foreign and domestic, as well as expressing the experience of two well known workers in this line The book is recommended for physicians, engineers, hygienists, nurses, teachers, and in fact all who are interested in industrial problems, as well as the general health officer.

SANITARY ENGINEERING

IT is trite to say that sanitary engineering occupies such a commanding position in public health that good books in that field are always welcome. We have to recommend *American Sewerage Practice, Vol. III, Disposal of Sewage,* by Leonard Metcalf and Harrison P. Eddy. Revised by Harrison P. Eddy, McGraw-Hill. The unfortunate death of Mr. Metcalf has left the revision of this 3rd edition to Mr. Eddy. In the 18 years which have elapsed since the 2nd edition, an enormous amount of knowledge has been gained, and incorporated in this work. The number of chapters has increased to 33, though the size of the book has been kept much the same. It will probably remain for many years, as the other editions have been, the standard. *Standard Methods for the Examination of Water and Sewage,* American Public Health Association and American Water Works Association, has reached its 8th edition. It has been greatly expanded and revised and continues to serve as the outstanding work in this field.

MENTAL HYGIENE

MENTAL hygiene has, as usual, occupied a fairly conspicuous place. *Mental Health,* by Frank E. Howard and Frederick L. Patry, Harper, is the result of the collaboration between the psychiatrist and psychologist. Since authors on mental conditions are apt to use language which is often obscure to the average reader, it is pleasing to note that this book is presented in an interesting manner and is highly practical. *The Subnormal Mind,* by Cyril Burt, Oxford University Press, is a thought-provoking volume built up on a series of lectures given by the author under the Charles Heath Clark bequest. The author breaks away from some of the old fashions, and joins McDougall and his followers. *Know Thyself: A Study in Mental Qualities,* by John Potts, Dorrance, presents in simple language and engaging style a plan for effective living. The reviewer considers it an outstanding contribution to the literature dealing with successful living. *Child Psychi-*

atry, by Leo Kanner, Thomas, has prefaces by Adolph Meyer and Edward A. Park. It is an encyclopedic treatise in this field.

HEALTH EDUCATION

THE usual number of books on health education have appeared this year. *Handbook of Health Education —A Guide for Teachers in Rural Schools,* by Ruth E. Grout, Doubleday, Doran, has been well received. This is made up largely of projects and experiments actually carried on in the schools of a rural section in New York but has much in it for adaptation to city schools.

PARASITOLOGY AND TROPICAL MEDICINE

TROPICAL medicine is much to the fore, and must continue to interest this country as a world power. Sir Leonard Rogers and Sir Oliver W. D. Megaw have issued a 2nd edition of their book, *Tropical Medicine,* published by J. & A. Churchill, Ltd. It is one of the best that we know. *Clinical Parasitology and Tropical Medicine,* by Damaso de Rivas, in collaboration with Carlos T. de Rivas, Lea and Febiger, represents an effort to produce a textbook written for students and practitioners in response to the demand for a treatise upon modern progress in tropical and parasitic diseases. We are indebted to Kenneth F. Maxcy and to the Commonwealth Fund for bringing out *The Bacteriology of Typhoid, Salmonella, and Dysentery Infections and Carrier States,* by Leon C. Havens, whose untimely death was such a loss to bacteriology and epidemiology. The text is more than a guide to the bacteriology of the group—it is a guide to clear thinking regarding the problems presented. *Manson's Tropical Diseases,* edited by Philip H. Manson-Bahr, Wood, has reached its 10th edition, and, needless to say, long ago gained its place as a standard text in tropical diseases. *The Principles of Bacteriology and Immunity,* by W. W. C. Topley and G. S. Wilson, 2nd edition, Wood, is extensively revised and bound in one volume. The chapters on immunity are unusually good. Its compendiousness, comprehensiveness, and accuracy make it an ideal book for all interested in bacteriology in its many relations. *Tissue Immunity,* by Reuben L. Kahn, Thomas, covers a broad field of interest, and the clinician can glean as much from its pages as the bacteriologist and pathologist. *Immunology,* by Noble P. Sherwood, Mosby, is an excellent book, especially for students. It gives an unusually clear presentation of a difficult subject. *Principles of Hygiene,* by Thomas A. Storey, Stanford University Press, has appeared in a revised edition. It is especially valuable in teaching the underlying bases of hygiene. *Medical Mycology: Fungous Diseases of Men and Other Mammals,* by Carroll William Dodge, Mosby, is a book of inestimable value as a reference work for the specialist or serious student of medical mycology. *The Algae and Their Life Relations,* by Josephine E. Tilden, University of Minnesota Press, is an excellent study which will be useful to many types of students—the public health engineer, for example, who is interested in the relation of the algae to public water supplies, and to stock men who are concerned with the problem of the poisoning of cattle compelled to drink water bloom algae. *A Guide to Human Parasitology for Medical Practitioners,* by D. B. Blacklock and T. Southwell, Wood, has reached its 2nd edition. It covers a lot of information in a small space. *Introduction to Human Parasitology,* by Asa C. Chandler, Wiley, has reached its 5th edition, and as always, maintains its place as an unusually useful book. The 5th edition of *Preventive Medicine,* by

Mark F. Boyd, Saunders, maintains its character as an exceedingly useful book.

GENERAL HYGIENE

IT is hard to classify many of the new books so they have been put in one group, more or less incorrectly. *Modern Home Medical Adviser: Your Health and How to Preserve It,* edited by Morris Fishbein, Doubleday, Doran, is one of those books the value of which is doubted by the reviewer. Conceding that such a book has a place in modern life, this is the best that we know of. The socialization of medicine has been much discussed for several years, and two very good books giving a bibliography on the subject have appeared: *Socialization of Medicine,* The Reference Shelf, Vol. 10 N,o. 5. Compiled by Julia E. Johnsen, H. W. Wilson Co., and *Free Medical Care, Socialized Medicine,* compiled and edited by E. C. Buehler, Noble and Noble. Somewhat along the same lines are *Security Against Sickness,* by I. S. Falk, Doubleday Doran, which is a good presentation of the current controversy over the Social Security issue, and *Cash Relief,* by Joanna C. Colcord, Russell Sage Foundation, which is a contribution in the field of social work rather than medicine. Two excellent books which deserve especial recommendation as being pioneers in their line are *Public Health Administration in the United States,* by Wilson G. Smillie, Macmillan, and *Introduction to Public Health,* by Harry S. Mustard, Macmillan. Dr. Smillie as a professor and Dr. Mustard as an administrator have both had extensive experience in the fields of which they write, and both books can be thoroughly recommended.

In view of the great attention which is being given by engineers to air conditioning, it is surprising that so few books on the subject have come to our desk. *Lewis' New Air Conditioning for Comfort,* by Samuel R. Lewis, Keeney Publishing Co., is excellent. A very useful book published by the Commonwealth Fund, is *Lobar Pneumonia and Serum Therapy,* by Frederick T. Lord and Roderick Heffron, giving us the latest information on the various types of pneumonia and the use of the improved sera which have been developed by Dr. Felton. It describes also the methods of typing the organisms and advocates the superiority of that of Neufeld. Louis I. Dublin and Alfred J. Lotka have once again placed us in their debt in *Length of Life,* Ronald Press. It should be read by everyone interested in public health or demography. While somewhat abstruse and very technical, it is presented in language which the reader of average intelligence can understand.

A book of unusual value appeared about the middle of the year, *The True Physician,* by Wingate M. Johnson, Macmillan. Based on lectures given to the graduating class from Duke Medical School, it is particularly adapted to advanced students and young doctors, but may well be read by all interested in the welfare of the medical profession. *Why Keep Them Alive?* by Paul De Kruif, in collaboration with Rhea De Kruif, Harcourt, Brace, has caused a great deal of discussion. It is a popular glorification of public health activities, devoted largely to child welfare. It is frankly propaganda for taking better care of the children. It is in the usual interesting style of the author. *Health and Human Progress,* by René Sand, Macmillan, is described as a learned, interesting, and stimulating essay on social progress. The name of the author alone assures us of its value. *An American Doctor's Odyssey,* by Victor Heiser, Norton, has been a best seller. It is a thrilling story of public health work in pretty nearly every part of the world, but especially in the East. It is worth

reading as a story of success and also as one of adventure. *My Life and Work,* by Adolf Lorenz, Scribner, is an autobiography of the well known bloodless surgeon. It is an interesting story of accomplishment and success by one who started life under a great handicap.

We are indebted once again to Wu Lien-Teh for *Plague: A Manual for Medical and Public Health Workers.* It is issued by the National Quarantine Service, Shanghai, China. Dr. Wu is too well known to need an introduction. As Director of the Manchurian Plague Prevention Service, he has had an enormous experience, much of it shared by his co-authors. Among his other services he has now given to China an excellent quarantine service. *Stamp Out Syphilis!* by Thomas Parran, *Survey Graphic,* is worth calling to attention once more, although few monographs have already been better advertised than this. However, it marks the beginning of a campaign against this great social disease. An unusually good book which would seem to have little place in a review of this sort, except for the fact that it stresses prevention in a way which would not be expected by the operator, is *The Thyroid: Surgery, Syndromes, Treatment,* by E. P. Sloan, Thomas. *The Legal Aspects of Milk Control,* by James A. Tobey, International Association of Milk Dealers, is a valuable text for those interested in the production and handling of milk. It gives 300 court decisions of importance to those in this line of work. *Sanitary Law and Practice: A Handbook on Public Health,* by W. Robertson, Charles Porter, and James Fenton, The Sanitary Publishing Company, has reached its 8th edition. While prepared for English readers, it contains an enormous amount of information of use to all engaged in the administration of public health. *Clinical Tuberculosis,* by Benjamin Goldberg, Davis, is a monumental work in two volumes. It presents an excellent panorama of the field of tuberculosis and is a good reference book for anyone interested in this most important subject. A few of the articles might be fuller, but on the whole the book is very satisfactory, and most subjects are treated fully. *Snow on Cholera,* Commonwealth Fund, is the second volume in the series of public health classics published for Delta Omega. The republication of two rare papers by John Snow is a contribution to our epidemiological literature. *Rural Health Practice,* by Harry S. Mustard, The Commonwealth Fund, gives the result of some 20 years' experience in public health practice—federal, state, city, and county—as well as the foundations and universities. It will be noticed that he uses "public health practice" rather than "public health administration" as being a more inclusive term for the work that he discusses. The book includes a mass of information and many suggestions, and discusses basic material applicable to larger communities as well as that peculiar to strictly rural districts. *The Development of Modern Medicine,* by Richard H. Shryock, University of Pennsylvania Press. Professor Shryock is not a physician, but for years has been interested in the study of the development of medicine as it relates to the social history of humanity. He begins his story with the 17th century, when scientific medicine received its first impetus from the philosophical tenor of the age. He shows the lag in advancement which accompanied the social and intellectual confusions of the following century, but places emphasis on the years after 1800, when medicine began to emerge as a socially responsible movement. His concluding chapter points out the challenging medical problems which remain to be solved.

BIOGRAPHY

THE year has brought us several outstanding books on biography. *Disease and Destiny,* by Ralph H. *Major,* Appleton-Century, contains much history of the great epidemics of the past and also the story of a number of the well known characters of history. It is a splendid piece of work. *Great Doctors of the Nineteenth Century,* by Sir William Hale-White, Edward Arnold and Co., is a masterpiece. The author is peculiarly fitted to produce such a book and has done it well. He brings out little known facts, such, for example, as the magnanimity of Sir Samuel Wilks, who preferred that Hodgkins be known rather than himself. *British Masters of Medicine,* edited by Sir D'Arcy Power, Wood, is another excellent work, giving biographical sketches confined entirely to British medical men. *Idols and Invalids,* by James Kemble, Doubleday Doran, gives a number of postmortems on a score of celebrated historical figures. It is interesting and apparently authoritative.

Disinfection and Sterilization—*By Ernest C. McCulloch. Philadelphia: Lea & Febiger,* 1936. 525 pp., ill. with 53 engravings. Price, $5.50.

The use of disinfectants preceded the rise and acceptance of the germ theory of disease. Hence the bibliography of the subject is extensive, including as it must articles published during the past 100 years. McCulloch's book is a welcome addition to the literature because he has taken the time and pains to digest the most important contributions to the subject.

The first third of the book deals with the fundamentals of disinfection and with physical agents such as heat, light, and filtration. Newer concepts are recognized, as in the discussion on filtration which is no longer regarded as purely mechanical but rather as a physico-chemical process. The remainder of the book deals with specific chemical methods. Both pure chemical compounds and commercial preparations are discussed in an impartial manner.

It is a pleasure to have the old "oxygen" theory of the action of chlorine and its compounds properly placed on the shelf.

There is little adverse criticism to make. If the controversial subject of skin disinfection had to be included, some mention of the work of Arnold should have been made. Perhaps Spencer's recent work on the action of radium on bacteria will be included when the next edition is printed.

The author has done a fine piece of work, which will be appreciated by those who find the literature of disinfection somewhat overwhelming and who are looking for definite knowledge.

JOHN F. NORTON

Manual of Public Health Laboratory Practice—*By J. R. Currie and Contributors. Baltimore: Wood,* 1936. 378 pp. Price, $6.75.

"The book here presented is addressed primarily to medical graduates and licentiates, the only persons who in this country can acquire a registrable qualification in public health, or later hold the position of medical officer of health in a local government area. It thus assumes in the reader that knowledge of the scientific fundamentals which every qualified practitioner should have acquired during his medical training. Without such an assumption it would be impossible to convey in a work of these modest dimensions any substantial instruction at all in the variety of topics treated." The author further tells us that the book was projected 3 years before its publication, and that he would have had doubts

about the wisdom of publishing it at this time had it not been for the contributions by others.

Like other English books of this nature, it is designed for English students, especially postgraduates seeking to qualify for public health work, and to a certain extent it must be judged in the light of this purpose. The book strikes us as being well planned and well done. One might criticise the relative number of pages allotted to each subject: chemistry 90, bacteriology 50, protozoölogy 40, helminthology 50, entomology 80, and meteorology 35. The reviewer being particularly interested in bacteriology, is inclined to think that in view of the extent to which public health depends upon bacteriology, more space might have been given to this important subject.

Some rather old fashioned methods are perhaps unduly stressed, and to that extent newer methods not sufficiently emphasized. There is no mention of the phosphatase test for proper pasteurization.

The illustrations are abundant and excellent and especially so for the sections on protozoölogy, helminthology, and entomology. The printing and make-up of the book are excellent. We believe the book can be highly recommended, especially if it is read in the light of the introduction, and remembering that it is designed for those working under English conditions. We in America owe so much to England in the way of public health that this should be no drawback except possibly for immediately practical work.

MAZŸCK P. RAVENEL

Tuberculosis Education: A Guide for Professional and Lay Workers —*By Elma Rood. Madison College, Tenn.: Rural School Press,* 1936. 125 pp. Price, $1.25.

Here is a manual which, though intended primarily for members of health associations and committees who are planning educational ventures in tuberculosis, is also rich in suggestions for health officers, public health nurses, school administrators, teachers, and other community workers. Tuberculosis education is presented on a community-wide basis, with suggestions on the content of such a program, outlines for institutes, details of exhibits and dramatic sketches.

Beginning with a lucid statement of the objectives for an educational program against tuberculosis, the author proceeds, showing good evidence of a long range perspective with no facile expedients. The chapter on Possible Outcomes of a Program Against Tuberculosis considers results to be expected in the health department, in the schools, in the community at large, and in the homes. Undoubtedly the author has had first hand contact with an excellent tuberculosis program and any administrator will be helped who will test his program against these yardsticks of lasting results.

The volume includes several short articles suitable for publication and suggested as illustrative material. Permission is given to reprint this part of the manual for purposes of actual tuberculosis education. Another chapter on Institute Suggestions will be of use in agencies where more systematic instruction of the professional staff is attempted. Appropriate consideration is given to the participation of the public schools in a program of tuberculosis control, and a very suggestive test which may be given to children to measure their information is included.

Perhaps one of the most useful features of the book is a section on Visual Materials and Methods in Tuberculosis Education. Anyone preparing an exhibit or an institute will find this section helpful. A playlet on tuberculosis pre-

vention and a bibliography of readily available material complete the volume and leave a reviewer convinced that the author has produced a manual quite worth while. This volume fits in between some of the more comprehensive works on educational methods and briefer reviews of technics in this field. It can be recommended as sound, stimulating, and practical.

REGINALD M. ATWATER

The Psychology of Adolescence —*By Luella Cole, Ph.D. New York: Farrar & Rinehart,* 1936. 503 pp. Price, $3.50.

"Adolescence as a universal phenomenon among the young of all social classes is a product of modern civilization. It is something new under the sun. . . . It is only recently that education has been extended and marriage delayed until a true period of adolescence has become an almost universal phenomenon in American life." With these arresting statements the author begins the first paragraph of her book, and proceeds to indicate the economic forces basically responsible for the prolongation of the adolescent period, and to review the rapid development of secondary and higher education. She aims: (1) to include only objectively proven facts; (2) to present a relatively comprehensive picture of the adolescent years; (3) to make the book as useful as possible, by interpreting the facts to show both their general importance and their practical usefulness. The second of these aims is carried out with a success which compensates to a large degree for the occasional failure to achieve the others.

The picture of the adolescent is clearly and interestingly presented. "Normal Adolescence" is discussed analytically in the early chapters dealing, respectively, with physical, emotional, social, moral and religious, and intellectual developments. The adolescent as a total personality is then considered in chapters devoted to the following types: the normal adolescent, the delinquent adolescent, the emotional deviate, the intellectual deviate, and the vocational misfit. Chapters on the adolescent and his home, his school, and the community deal with his adjustments to his environment in an informative and constructive way, and a concluding chapter on the end of adolescence offers "pragmatic criteria" of maturity and suggestions for the prevention of adult maladjustment which are decidedly academic.

It is unfortunate that a book of such general excellence should offer as "objectively proven facts" a considerable amount of controversial material and contain inferences and generalizations for which little support is apparent. Much of the discussion of physical developments is misleading for the above reasons. The general impression conveyed is that the several bodily systems are in violent conflict with one another and are unadjusted with respect to their component parts. Differences in growth rate are said to result in "lack of balance among bones, muscles, glands, heart, lungs, brain, and viscera," and this, in turn, "is the basis for much of the misery usually accompanying growth throughout this period" (p. 17). Among the discomforts, "growing pains" are said to result from the fact that "the bones are sometimes too long for the muscles adhering to them," and clumsiness results "if his muscles lengthen faster than his bones do" (p. 26). Again, it is stated that "The most conspicuous fact in regard to development in the (circulatory) system is the disparity in growth between the heart and its arteries," and this is taken to account for the fact (?) that "during this period of adolescent growth practically all boys and girls experience

faintness, dizziness, palpitations, headaches, and restlessness" (pp. 28–9). The chapter on emotional developments, while offering much of practical value, contains a brief discussion of the nature of emotions which contradicts the rest of the material and is quite misleading. An emotional experience is said to be divisible into 3 parts—the stimulus, the internal adjustments, and the response. The "internal adjustments . . . have to be studied by the physiologist and do not constitute a psychological problem. The teacher should understand their nature, but there is nothing she or anybody else can do about them" (p. 57). In spite of this, emotional conditioning is carefully discussed and illustrated.

In Chapter X, The Intellectual Deviate, we read that "an adolescent must achieve a mental age of at least 12 before he develops even elementary concepts (of morality); a mentality of 14 is needed for any really adequate understanding of generalized principles of behavior" (p. 345), and, on the opposite page, "There is no reason to suppose that social incompetence is inherent in dull or low normal individuals."

The book, on the whole, offers much that is of value to the discriminating reader who is well grounded in the physiology and psychology of childhood, but its reading by the average parent or teacher, for whom it is intended, will be fraught with considerable risk of misunderstanding the real nature of the adolescent's problems.

FREDERICK W. BROWN

Allergy of the Nose and Paranasal Sinuses—*By F. K. Hansel. St. Louis: Mosby,* 1936. 832 pp. (61 ill.). Price, $10.00.

This monograph of Dr. Hansel's is more comprehensive than the title indicates because it covers quite extensively and intensively the whole field of allergy. The material in Chapters I to VII, XVI to XXIII, XXVII to XXVIII inclusive, is of special interest to all physicians as well as to the otolaryngologist. This material has not been readily available to either medical students or physicians.

Chapters VIII to XV inclusive present a detailed and rather uncritical discussion of anaphylaxis in animals and clinical allergy in man. The author goes into great detail in describing collection and preparation of test materials and methods of using them.

There are some errors and some omissions. Amyl nitrate is given for amyl nitrite. Recent work indicating a virus etiology for influenza is not mentioned. The sweeping statements made as to the sensitizing properties of *any* haptene fraction of bacteria need revision. The author cites the work of Zinsser and Parker on passive sensitization with antityphoid sera, but omits subsequent papers retracting certain conclusions. No reference to recent work on air conditioning and allergy was found either in the index or the contents. The author's style is reasonably clear although he is inclined at times to indulge in unusually long sentences and perhaps unnecessary repetition. On the whole the book is well written, nicely illustrated, and well bound.

There are a few errors in spelling, obviously typographical. This book can be read with profit by medical students, physicians, otolaryngologists, and allergists. The criticisms should not be regarded as detracting from the value of this exceptionally fine monograph.

N. P. SHERWOOD

Food, Nutrition and Health—*By E. V. McCollum and J. Ernestine Becker (4th ed.). Baltimore: Published by the Authors,* 1936. 154 pp. Price, $1.50.

The fourth edition of this well known little book is before us. It contains a nontechnical account of the most important discoveries in nutrition and their relation to daily life. The authors hope that the material given will assist readers in detecting misinformation now being so widely disseminated by faddists and promoters. The material given is accurate and useful.

MAZŸCK P. RAVENEL

Feeding, Diet and the General Care of Children—*By Albert J. Bell, M.D. (3rd ed.) New York: Putnam,* 1936. 316 pp. Price, $2.00.

The third edition of Dr. Bell's practical manual for mothers and nurses has been thoroughly revised. The material is presented in convenient form and is not burdened with extraneous matter. The illustrations are well chosen and the photographic reproductions are excellent.

The new edition incorporates a chapter by Dr. Ada Hart Arlitt on Some Aspects of Behavior in Early Childhood, and a timely chapter on Dentistry, by Drs. Henry Thomason and Frederick W. Black.

The feeding formulae measure up to standards of current pediatrics. The presentation of communicable diseases is simple enough for any mother to understand.

The book is well indexed and should prove helpful to all those dealing with young children. RICHARD A. BOLT

The Legal Aspects of Milk Control—*By James A. Tobey, Dr.P.H. Chicago: International Association of Milk Dealers,* 1936. 102 pp. Price, $3.00.

This book gives an analysis of over 300 American court decisions regarding the legal aspects of milk control, with discussions of the reasons for the public control of milk, sanitary regulation by the state, and by the municipality. While written primarily to give the milk industry a source book dealing with these basic questions, it is of equal value to the public health administrator and the sanitary officer.

The importance of periodic review of milk ordinances is recognized. Although the power of municipal corporations to pass legislation for the control of milk supplies and other dairy products in the interests of public health is well established in American jurisprudence according to the author, the ordinances adopted must be reasonable and not arbitrary, capricious, or discriminatory. On a number of occasions, the courts have held that specific ordinances were void because of such defects.

In view of increasing interest in pasteurization, it is noteworthy that a city ordinance requiring that no milk should be sold or distributed in the city unless it was certified or pasteurized was upheld by the Supreme Court in New York late in 1935. Said the Court:

> By a fair preponderance of the evidence, it is established, and the Court finds that the process of pasteurization of milk makes it safe for human consumption and milk which had not been pasteurized and which is termed raw milk is the subject of greatest concern by health authorities and is safeguarded only with the greatest difficulty.

The concluding chapter deals with liability in connection with dairy products, including liability of health officials. This is followed by a detailed table of cases and a useful bibliography.

IRA V. HISCOCK

Partners in Play—*By Mary J. Breen. New York: Barnes,* 1936. 186 pp. Price, $1.00.

Designed primarily for recreation leaders of young people between the ages of 12 and 30 years, this text covers such chapters as the Need for More Organized Play for Mixed Groups,

Dances and Their Management, Games for Mixed Groups, Parties and Socials, Hikes and Outings, Swimming and Water Sports, Snow and Ice Sports, Music, Drama, and Discussion Groups.

This is useful material prepared for the National Recreation Association, and National Board of Young Women's Christian Association.

CHARLES H. KEENE

A Textbook of Bacteriology and Its Applications — *By Curtis M. Hilliard (rev. ed.) New York: Ginn. The Athenaeum Press,* 1936. 339 pp. Price, $3.50.

In the preface it is indicated the book is intended as a text for nurses and students of home economics and social work. This seems to be true to an extent that might slightly detract from its use by men students. "It attempts to present the fundamental concepts of bacteriology and its most important practical applications" in contrast to textbooks that feature bacteriology in its medical aspects, but the volume—although it covers applied microbiology well—does not deal much more thoroughly with applications than do several other well known textbooks on the subject. The author's viewpoint that bacteriology and microbiology are synonymous terms would not be readily accepted by most authorities. It is a textbook on microbiology. In an introduction Professor Samuel C. Prescott suggests that the book should be useful as well to the lay reader.

The order of presentation of the material is pretty much the standard one. The historical portion is sufficiently complete for beginning students pursuing the subject for cultural purposes without the expectation of becoming bacteriologists. The illustrations and tabular material are in the main well chosen and adequate. The space devoted to yeasts seems scarcely sufficient and more material no molds might have been included. The subject of respiration of anaerobes is not too completely discussed. Some of the interpretations of bacterial dissociation that are not too generally accepted are given undue emphasis.

The public health phases of bacteriology are well presented with rather pertinently chosen references to epidemiological and statistical applications. The bacteriology of water and of milk and the preservation and refrigeration of food are covered more exhaustively than in some textbooks. Infection and immunity are given some consideration. The inclusion of sewage treatment under fermentation is perhaps a little unusual but is strikingly to the point. The chapter on The Public Health Laboratory should be instructive to most students. The microscopic Widal technic given for the examination of specimens of dried blood is so rarely used at present that it should be omitted. The statement (p. 285) that "Typhoid-bacillus carriers will give a positive Widal test in the majority of cases" should begin to disappear from textbooks.

In Appendix B and Appendix C, parts of the *Standard Methods of Water Analysis* and *Standard Methods of Milk Analysis* of the American Public Health Association that seemed important to the author are reprinted. Appendix A gives, in "a march of time" fashion, important dates in bacteriology. Some dates and names are omitted that might well be there.

In the revised edition of a textbook intended for use in a recognized institution of culture in New England it is almost alarming to find errors in grammar and faults in construction continuing almost from page to page. An occasional infinitive is neatly split! Carelessness unnecessary in a revised edition is evident. Particularly annoy-

ing is the use of pronouns to begin sentences with the antecedent discernible only after a search back through one or two sentences. The book seems to have been prepared from frequently annotated lecture notes not carefully revised.

Inconsistencies occur between statements in different portions of the book. Paragraph construction does not appear to have been given much thought. "One of the author's works on two hundred forty-two pure cultures of streptococci" (page 90) is perhaps a clear statement if he has written another treatise on the same number of cultures of this organism; "membrane of the bacteria" (page 86) should probably read "bacterium." The reference (page 92) to the "table on page 84" should refer to page 88. "Electric dissociation" (page 86) would seem to be loose usage for "electrolytic dissociation." There is a lack of nicety in the sentence construction (page 133): "Ammonia serves in a limited way as a food for plants, especially the cereals, rice preferring ammonia to nitrate; so that the organisms involved really prepare a plant food." The "tribe *Bacteriaceae*" (page 146) should read "*Bacterieae*" and seems sloppy usage at a place where the characteristics of the tribe are described. The constant use of the author's own abbreviations for the genus names of organisms is exasperating (although he has by no means a monopoly on the practice). Since the genus name of a microörganism corresponds to the family name among humans, the use of *Sal. Suipestifer,* for example, somewhat corresponds to writing James Hog. for James Hogan. The author does not adhere as closely to the names in *Bergey's Manual* as he promises to do, and *Escherichia coli* is sometimes written "*Esch. coli*" and sometimes "*Bact. coli.*"

It is annoying that almost innumerable flaws mar a really worthwhile textbook that treats bacteriology from a sensible public health viewpoint. Certain bacteriologists would consider the book elementary, but if the students in Professor Hilliard's classes at the end of their course know half of what it contains they will have a better knowledge of the sciences of bacteriology and public health than do many medical school graduates who have perused more pretentious tomes.

FRIEND LEE MICKLE

Manual of the Essentials of Good Hospital Nursing Service—*By Division on Nursing of the Council of the American Hospital Association and a Committee of the National League of Nursing Education. New York,* 1936. 38 pp. Price, $.75.

Public health officials who are also responsible for the administration of hospitals and for the standards of nursing service maintained in them will find this small publication both helpful and interesting. Prepared by a joint committee of the American Hospital Association and the National League of Nursing Education, it attempts "to set forth some of the essentials on which a good nursing service in a hospital without a school may be built and maintained. It has given no set patterns of organization and practice, but has suggested certain principles and procedures which may be applied to the nursing service of any hospital, regardless of its character or size." Of particular value is the discussion of the nursing service personnel requirement — the ratio of nurses to patients, of bedside nursing hours for ward, semi-private, and private patients, and the staffing of special services such as the operating room and outpatient department.

That this is an important factor in planning is borne out by a statement in

Hospital Organization and Management (p. 384) by Dr. MacEachern who says:

> The influence of adequate personnel on the death rate is shown by a comparison of two hospitals both well equipped, having the same medical staff and the same class of patients. In one, the ratio was one nurse to six patients and the postoperative death rate was 5.5 per cent; in the other, having a ratio of one nurse to one and one-half patients, the postoperative surgical death rate was 1.8 per cent.

A companion volume to this publication is *Essentials of a Good School of Nursing,* published by the National League of Nursing Education. Both are concisely written, outlining essentials without going into minute detail, and are thought-provoking and extremely helpful publications.

KATHARINE FAVILLE

The Development of Modern Medicine—*By Richard H. Shryock. Philadelphia: University of Pennsylvania Press,* 1936. 442 pp. Price, $4.00.

This work, written by a layman, should be read by both physician and layman. Most books on the medical topics are from the pens of physicians. This one, however, by a distinguished historian, reveals a profound insight into the problems of medicine as well as an unusual grasp of other fields with which medicine comes into the most intimate contact. The great majority of books which record the progress of medicine are devoted almost exclusively to the lives and achievements of outstanding physicians or of men working in allied sciences, while this, by contrast, although it does not in any way detract from the achievements of these outstanding men, measures these achievements in the light of their influence upon society at large. In addition, the author has delineated quite clearly the effects of various religious currents, political theories, and economic changes upon the status of the medical profession and upon the progress of medicine.

The story of the tremendous influence of the discovery of new instruments upon the progress of medicine is extremely well told. Equally interesting are the chapters pointing out the determining influence of physics, chemistry, mathematics, and of the new science of statistics.

The practising physician must feel encouraged at the author's conviction that medical science has regained public confidence to a striking degree. Some physicians who are very pessimistic on this subject will feel very much heartened after reading Professor Shryock's analysis of this matter. The closing chapters, which bring medical history up to date, are quite as interesting as the earlier ones. The brief sketch of "A Delayed Advance Against Mental Disease" is very well done. Here the author describes the work of Charcot, of Freud, and of Jung in an interesting and yet quite detached and objective manner. The chapter "Practice in a Changing Society" is of especial interest to the physician of today. We only wish it had been much longer. In the final chapters, "American Experience" and "Some Contemporary Questions," Professor Shryock discusses some of the problems which are agitating the medical profession at the present time. Here again the author describes the various types of medical practice with clarity and objectivity. These chapters especially impressed the reviewer as being written by a historian and not by a propagandist. Such a distinction was never more necessary, since many of our present-day writers of history are really not historians at all, but merely propagandists.

The make-up and printing of the book are exceptionally good. One typographical error, particularly unfortunate

as the book is designed for laymen as well as doctors, is found on page 267, where *flavus* is used where *favus* is evidently intended. We wish for the book a wide circulation and trust that the author will continue his illuminating studies. RALPH H. MAJOR

The Baby and Growing Child— —*By Louis Fischer, M.D. New York: Funk & Wagnalls,* 1936. 260 pp. Price, $1.50.

We have here an average book on the care of babies and older children, one which has its good points and its weak points. One of the faults is that it is in spots too technical for the use of the layman, yet on the whole not complete enough for the use of anyone else. Its other major fault is one common to many similar manuals, namely, advising the family to call in the family physician for various ailments and at the same time telling what treatment the author uses, or suggesting that perhaps the doctor when he comes may do this or that. Mention of treatment should be omitted entirely when the advice is given to call the doctor.

Other points open to criticism are: the impression given that children receiving one dose of toxoid with negative Schick test following are, as a rule, protected against diphtheria for life; the curious statement that "an occasional case of diphtheria is seen in hospital and private practice even today"; statements concerning the number of days a child should be kept at home with communicable disease, no reference being made to the fact that quarantine periods are not uniform throughout the country. A slip occurs regarding the use of tomato juice as an antiscorbutic. In one place the assertion is made that probably at least five times as much tomato juice as orange juice should be used; in another place, the figure is twice as much. There is an entirely unnecessary section on anesthesia and anesthetics, featuring the use of avertin. The references to prenatal care are sketchy.

On the whole, while this is a popular manual by an excellent pediatrician, one has to confess that all the information the mother of young children can use wisely can probably be more easily obtained from the pamphlets offered free by federal or state health authorities than from this or most other books of its kind. MERRILL E. CHAMPION

Medicolegal Cases: Abstracts of Court Decisions of Medicolegal Interest. *Chicago: American Medical Association,* 1936. 888 pp. Price, $5.50.

Between 1931 and 1935, abstracts of about 900 court decisions of direct interest to physicians were prepared by the Bureau of Legal Medicine and Legislation of the American Medical Association, and published in the weekly numbers of the *Journal of the A.M.A.* These abstracts have now been issued in this useful volume, which supplements a previously published book of 1,270 pages giving similar court decisions for the period from 1926 to 1930 inclusive.

Although the abstracts are arranged in a rather hit-or-miss fashion, probably as they came in, an excellent index permits the reader to locate quickly any subject in which he is interested. The physician may be astounded at the number of malpractice actions that have been before the courts, but by perusing them he may be able to avoid some of the legal troubles that have beset his colleagues.

A considerable number of cases on various aspects of public health are included and will be of special interest to sanitarians. There is a table of cases, alphabetically arranged, which would be even more valuable if complete citations to all the various law reporters

were given and the year of each decision was included. This well printed book should be a valuable addition to the libraries of all practising physicians, health officials, and attorneys interested in legal medicine. JAMES A. TOBEY

The Riddle of Woman: A Study in the Social Psychology of Sex—*By Dr. Joseph Tenenbaum. New York: Lee Furman, Inc.* 477 pp. Price, $3.50.

Dr. Tenenbaum has presented a well organized survey of "The Riddle of Woman." He has discussed a vast variety of details concerning woman as a virgin, wife and widow, spinster, mother, and adulteress, as mother-in-law, witch, as siren, and prostitute.

The public health officer will find very little of significance or advantage in this volume which, while concerned with the social psychology of sex, reveals little interest in the social aspects of female activities as affecting human welfare. While there is an implication that prostitution has changed from a moral problem to a social menace, he regards it as "the moral safeguard of marriage, a bulwark of monogamy, an insurance premium against sexual anarchy." This has little to do with the problems of syphilis and gonorrhea, segregated areas, or the transmission of dysgenic factors through venereal disease.

A momentary discussion of the sex linkage of hemophilia and color blindness practically represents the breadth of the public health outlook of the author. There are no significant references to diseases peculiar to woman or those transmitted by them.

The inadequacy of the volume, from the standpoint of public health, is due to the fact that the author emphasizes the underlying instinctual psychology in which sex forms the most important factor. Some of the data are open to question because of too-ready generalization from specific behavior among certain primitive people.

While Dr. Tenenbaum has sought information from the collateral fields of biology, sociology, psychology, and anthropology, he has failed to unify them into any public health concepts. Hence the volume is to be regarded as merely a book of interest rather than of service to public health workers.

The presentation is journalistic in style, readable, and entertaining. It may, perhaps, afford some pleasurable recreation for the health officer who is weary with his daily task and wishes to dwell upon a riddle that still remains to be answered. IRA S. WILE

Vitamins and Other Dietary Essentials—*By W. R. Aykroyd, M.D. (2nd ed.) London: William Heinemann, Ltd.,* 226 pp. Price, $2.75.

This book has had the advantage of criticism since 1932. The author has avoided giving detailed diets, specimen menus, etc., his chief object being to interest the general reader in a subject, the importance of which is being more and more recognized every day. The usual subjects are considered and the author goes at some length into the influence of diet on teeth. He evidently sides with Mrs. Mellanby on this matter. Some will accept what he says and many will not.

The book is interestingly written and well repays the reader for time spent on it. The make-up and printing are excellent. MAZŸCK P. RAVENEL

Hygiene—*By Walter W. Krueger. (2nd ed.) Philadelphia: Saunders,* 1936. 294 pp. Price, $1.75.

This is a revision, to some extent, of a text first published in 1932. The chapter on Posture and Its Bearing on Health might well present more clearly the newer concept that disorders of the

human body cause poor posture perhaps more often than does poor posture cause body disorders.

The first edition was reviewed in the *Journal*, April, 1933, p. 400.

CHARLES H. KEENE

Chemistry of Food and Nutrition—*By Henry C. Sherman. (5th ed.) New York: Macmillan*, 1937. 640 pp. Price, $3.00.

The first edition of this book was published in 1911. Ever since its first appearance it has been a standard text. All that need be said of this edition is that the tremendous amount of research in the chemistry of food and nutrition has made necessary a complete rewriting of the book. The arrangement has been somewhat changed for the incorporation of new material and the number of chapters of the book have been increased to 27. This edition, for the first time, gives the averages of a new order of precision with statistically determined probable errors and coefficients of variation.

The name of the author is sufficient guarantee of the completeness and accuracy of the book. The printing and make-up are excellent.

MAZŸCK P. RAVENEL

Applied Dietetics: The Planning and Teaching of Normal and Therapeutic Diets—*By Frances Stern. Baltimore: Williams & Wilkins*, 1936. 236 pp. Price, $3.00.

This book is a logical development of the long experience and mature judgment of the author in her work at the Boston Dispensary. The volume is packed with tables, charts, and formulae of valuable information on food composition, nutritional requirements, and diet therapy. Here may be found in readily accessible form all the material required to build diets for any disease, condition, or deficiency. Causes, symptoms, and treatment of dietary deficiencies are discussed. For the benefit of the social worker, the influences in the physical and mental life of the patient and the effect on his food habits are explained. The author presupposes the reader to have a fundamental knowledge of the physiology of the body and the chemistry of foods and nutrition. The book will serve as an excellent guide to physicians, nurses, institutional and social workers, and to dietitians it is a veritable handbook. The printing is clear and the binding good.

C. R. FELLERS

Eugenic Sterilization—*Committee of the American Neurological Association. Abraham Myerson and Committee, consisting of James B. Ayer, Tracy J. Putnam, Clyde E. Keeler, and Leo Alexander. New York: Macmillan*, 1936. 203 pp. Price, $3.00.

This report was presented and discussed at the meeting of the American Neurological Association in 1935. It is a part of the legal medicine inquiry made by the New York Academy of Medicine through Carnegie Foundation funds. The report attempts to evaluate in a critical way the inheritance of mental disease, feeble mindedness, epilepsy, and crime from the standpoint of eugenic sterilization. There are therefore two purposes served. One is to gather data on the inheritance factors, the second is to test the value, necessity, and ultimate benefit to society of sterilization in order to breed out the genetic load which these diseases are thought to provide.

The introductory chapter is given up to definitions of the various terms used in genetic literature—eugenics, sterilization, inheritance, etc. The second chapter contains a résumé of all the state sterilization laws and some of the foreign countries. This is a valuable contribution. Nowhere else in such a brief

form is this material available. The rest of the volume is concerned with the more detailed consideration of the justification for sterilization and the data available in any given disease or given individual upon which the necessity for sterilization can be based. The inheritance factors in the production of diseases commonly thought to be genetically carried on from one to the succeeding generation are subjected to a critical analysis. The result is to throw a great deal of doubt upon the generalizations that have been made and upon which the sterilization laws have been based. Epilepsy, for example, has been found to be almost without inheritable factors.

The inheritance of crime or criminal tendencies is so complicated with environmental factors that no certain estimate can possibly be established. The inheritance factors in dementia praecox and manic depressive psychoses—at first sight so definite become less so as the statistical material is analyzed and as the question of marriage and reproduction is brought into realistic relationship with the problem.

The facts that schizophrenics do not frequently marry and that the sex impulse is so frequently lacking or very much lessened in these individuals appear to point to a natural solution of the inheritance probability in these cases. The same clear-cut critical and skeptical point of view is present in the manic depressive group. The question is put as to the worthwhileness of the contribution to society of those roughly belonging to this group. It seems far to outweigh the amount of social damage that might conceivably follow marriage and reproduction in this group.

Running throughout this book is the fine critical and socially sensitive point of view of Myerson, Chairman of the Committee, who no doubt controlled and guarded the study of its write-up.

Recommendations: (1) Laws concerning sterilization should be voluntary and regulatory rather than compulsory. (2) Laws should be applicable both to state and private institutions. (3) Machinery for administering sterilization should be composed of boards with special training. (4) Adequate legal protection for such boards and for surgeons carrying out sterilization procedures.

Selective sterilization might be applied to: (1) Huntington's chorea, (2) feeblemindedness, (3) dementia praecox, (4) manic depressive psychosis, (5) epilepsy. These are the categories, but the whole spirit of this book is against anything but the most careful selection. If this is done the sterilization necessity will be found to be very small.

This is a good book. It is brief, readable, and entirely in the spirit of scientific inquiry. It is a good antidote for the loose thinking that has become prevalent on the subject of eugenic sterilization. SIDNEY I. SCHWAB

Tissue Immunity—*By Reuben L. Kahn. Springfield, Ill.: Thomas,* 1936. 707 pp. (ill.) Price, $7.50.

Kahn has described quite simply but very clearly a large number of carefully planned experiments on rabbits in the hope of elucidating some of the mysteries of tissue immunity. The results are recorded and summarized. The chapters end, as a rule, with what the author calls clinical considerations.

It is disappointing to find in a monograph on *tissue immunity* that when the author discusses his tissue experiments, he makes no reference to specific anatomical structures or definite physiological mechanism but deals only in rather abstruse discussion. He seems neither to think in terms of lymphatics, capillaries, motor, sensory and vasomotor mechanisms, irritability and per-

meability factors, endocrine functions nor to recognize the extensive distribution in the skin and other tissues of phagocytic cells and the importance of the proteolytic enzymes which they contain.

The first chapter is a philosophical and to some extent a historical discussion of the rôle of the tissues in immunity and gives the impression that the author conceives of tissue-antigen reactions as occurring independently of antibody. The following quotations (p. 390) indicate that such a conception is not held by Kahn:

> We refer to antibodies as immune globulin because by this means it seems simpler to correlate the relationship between a passively-immunized and an actively-immunized animal. Suppose it is assumed that, as a result of active immunization, there is a shift in the albumin-globulin ratio in the tissue cells, which increases the globulin content. And suppose it is assumed further that one of the outstanding characteristics of this new globulin is its marked affinity for, or combining power with, the specific antigen. Then, when the tissue cells produce an amount of this globulin which is in excess of that which can be retained within their cell structures, some of the globulin will "overflow" and be washed away from the cells. These cellular washings will accumulate in the body fluids, and soon, these fluids will exhibit the property of combining with the antigen.

Also (p. 103):

> Suppose it is assumed that the basic change in a cell, as a result of immunization, is the formation of immune globulin within the cell and that it is this immune globulin that has a marked affinity for the antigen.

On page 391 he says:

> All tissue cells are capable of producing immune globulin or antibodies and that some cells possess this capacity to a greater extent than others.

Further on page 398:

> The extent of the immunity of the passively-immunized animal to a protein antigen is dependent upon the cellular washings or circulating antibodies of the actively-immunized animal, while the extent of the immunity of the latter animal is dependent upon immune globulin which cannot be washed away from the cells and which is an inherent part of their structure, in addition to any antibodies that might be present in the circulation.

It is clear from the wording and by a definite statement on page 97 that, "The nature of the tissue-antigen union can only be surmised."

The conception that *all* tissue cells are capable of producing a defensive substance was apparently held by Ehrlich and can be supported by references to results of various investigators since. By original, simple, and quite ingenious technic Kahn demonstrates a great many phenomena observed by using other methods. While there will probably be little controversy over the phenomena he describes, it is certain that his philosophical interpretations of what he sees and of what goes on behind the scenes will not meet with universal approval. In several places he explains the disappearance of antigen from the blood and tissues as due to the proteolytic action of immune globulin. On page 434 he speaks of embryonic tissue as more resistant than older tissue. As a general statement this will be questioned. On pages 461–462 he speaks of racemized proteins, gelatin and proteoses as haptens in the sense used by Landsteiner. These are only a few of the author's hypotheses that will arouse criticism. The author admits these opinions are not capable of proof at present but hopes they will stimulate greater interest in tissue immunity.

The book is well arranged and indexed and is exceptionally free from typographical errors. The publishers are to be congratulated upon their achievement. N. P. SHERWOOD

Health-Happiness-Success Series (ill.)—*By William E. Burkard, Ph.D., Raymond L. Chambers, Ph.D.,*

Frederick W. Maroney, M.D. Chicago: Lyons and Carnahan, 1936. ***Health By Doing*** (4th Grade), 314 pp., $.57; ***Building for Health*** (5th Grade), 309 pp., $.57; ***The Body and Health*** (6th Grade), 313 pp., $.57.

Didactic teaching of health precepts, physiology, preventive medicine, and community health and sanitation characterize this series of books prepared for the higher elementary grades. In the make-up of the books the bold face topical headings throughout make a strong, and not pleasant, contrast to the occasional semi-pastel colored plates of illustrations. ANNA B. TOWSE

Sickness and Insurance — ***By Harry Alvin Millis. Chicago: University of Chicago Press,*** 1937. 166 pp. Price, $2.00.

This small volume is a survey of the social and economic problems created by sickness, and methods suggested to remedy them. The volume offers the traditional presentation of the subject by first analyzing the problem in the United States; then reviewing the European experience with insurance plans, dwelling in some detail on experiences in England, France, and Germany; and concludes by discussing proposals suggested for this country.

No new information or light is thrown on the problem, but much of the pertinent data is succinctly introduced with original sources carefully indicated. The author maintains a very dispassionate attitude, and is fair to opposing sides in controversial matters. The material is brought carefully to date, so that individuals who last reviewed the subject when the tempest caused by the report of the Committee on the Costs of Medical Care was at its height will know what developments have occurred since then.

The author agrees with economists and social workers as opposed to the spokesmen of the American Medical Association in believing that health insurance is a need second in importance only to unemployment insurance. He agrees that a distribution of financial burden is required for the lower income groups, and suggests that contributions by employees, employers, and the government is preferable to payments from tax funds only. He considers it sound to inaugurate a compulsory plan from the outset in contrast to various voluntary plans. To achieve coöperation of the reluctant medical profession, he advocates that in the beginning at least, the insurance should cover only high cost illnesses, and that it should be integrated with the growing group hospital payment plans. The author agrees with all students of the problem that the financial benefits should be separated from the medical benefits, and suggests that this can be easily accomplished through the organization set up by the Social Security Act. Even though an economist, the author is appreciative of the medical requirements of the problem, as well as the public health and preventive aspects of it.

This volume, in my opinion, provides an excellent introductory discussion of the problem for the student, social worker, or physician—complete, yet brief, and written as readably as material can be which includes statistical matter and descriptions of insurance plans. W. R. WILLARD

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Tuberculin Testing of School Children—What is being done in the several states in the tuberculin testing program is summarized in this committee report that discusses some of the problems which accompany and follow the general application of the test. Incidentally, the paper is the first in what amounts to a new publication in the health field. All health workers will want to see it.

ANON. Tuberculosis in Children. J. School Health. 7, 1:1 (Jan.), 1937.

A Better Chance for the Country Child—This is a thoroughgoing presentation of the problems involved in programs of rural education and the need for more study and research. It discusses the need for more and better schools, better teachers, location of schools in relation to population and its mobility, and a better administrative set-up.

CYR, F. W. Needed Research on the Reorganization of School Districts in Rural Areas. Teachers College Rec. 293, 38:4 (Jan.), 1937.

The Future in Medical Care—Loss of income due to unemployment eventually will be covered by insurance. Will not the same protection be wanted for illness? This is a stimulating discussion of the trends in medical science, public welfare and social security, and a prediction of the changes which will result in public health and medical practice.

DAVIS, M. M. Next Moves in Medical Care. Survey Graphic. 24, 2:70 (Feb.), 1937.

Sterilization of Supplies—Experiments are described which show need for knowledge of the temperature as well as pressure attained when steam sterilizers are used. Safe sterilization can be accurately defined only on the basis of actual temperature attained. Operators of sterilizers usually place confidence on the final pressures observed. Pressure, *per se*, does not indicate temperatures sufficient for the destruction of microörganisms. This is one of a series of articles representing results of research done at Western Reserve University in Cleveland.

ECKER, E. E. Sterilization Based on Temperature Attained and Time Ratio. Mod. Hosp. 86, 48:2 (Feb.), 1937.

All About Tularemia — Where, when, and how to catch the Bacterium tularense.

FRANCIS, E. Sources of Infection and Seasonal Incidence of Tularemia in Man. Pub. Health Rep. 52, 4:103 (Jan. 22), 1937.

Paratyphoid Fever—This dreadful exhibit of American sanitary carelessness, a row of company owned miners' houses, is paraded for the edification of the Canadian sanitarians. After the epidemic had peppered the homes, the polluted well was closed and sanitary privies were installed.

FRANKLIN, J. P., and HALLIDAY, C. H. A Water-borne Outbreak of Paratyphoid A Fever. Canad. Pub. H. J., 28, 2:82 (Feb.), 1937.

Prohibition and Drinking—During 1920, the first year when alcoholic drinks were hard to get, drunkenness showed a marked reduction in Massachusetts. For the next 4 years, drunks began to get access to all sorts of alcoholic preparations and poisoning was more common. From 1925 to 1933

decreases were recorded in rates of deaths from alcoholism, alcoholic psychoses, and arrests for drunkenness. During the first repeal year, the rates began to rise. Time will tell the net result.

GUTHRIE, R. H., and DAYTON, N. The Incidence of Alcoholic Psychoses in Massachusetts, 1917–1935. New Eng. J. Med. 216, 5:193 (Feb. 4), 1937.

Control of Rheumatism—Public health measures which may be taken to prevent rheumatic heart disease are excellently summarized in this brief paper. With so much that needs doing, it is a reflection upon modern health administration that officials take so small a part in urging the amelioration of the worst factors.

HEDLEY, O. F. Salient Public Health Features of Rheumatic Heart Disease. Pub. Health Rep. 52, 6:164 (Feb. 5), 1937.

Deer Flies Spread Tularemia—Insect transmission of tularemia is possible, so unless precautions are taken, construction projects in highly infected districts may be jeopardized. This has a military implication also.

HILLMAN, C. C., and MORGAN, M. T. Tularemia. J.A.M.A. 108, 7:538 (Feb. 13), 1937.

Vaccines and Sera—Plain truth about preventive inoculation by an author who concludes that there are three groups of treatment: (a) those that are unquestionably of value, *i.e.*, cowpox vaccine and diphtheria toxoid; (b) those that give equivocal benefits and hence are luxuries, *i.e.*, typhoid and respiratory vaccines and scarlet fever toxin; and (c) those for which there is little or no evidence of value, *i.e.*, whooping cough vaccine and measles globulin.

O'HARA, D. Preventive Inoculations. New Eng. J. Med. 216, 6:236 (Feb. 11), 1937.

School Child Health — Effective utilization of school grouping for improving child health (supplementing the work of the family physician) is presented in a detailed plan for school medical and dental service.

SMILEY, D. F. An Approach to the Problem of School Medical and Dental Service. J.A.M.A. 108, 6:436 (Feb. 6), 1937.

BOOKS RECEIVED

HEALTH QUESTIONS ANSWERED. By W. W. Bauer. Indianapolis: Bobbs-Merrill, 1937. 368 pp. Price, $2.00.

A LAYMAN'S HANDBOOK OF MEDICINE. Richard C. Cabot. rev. ed. New York: Houghton Mifflin, 1937. 541 pp. Price, $2.50.

AUTOPSY. DIAGNOSIS & TECHNIQUE. By Otto Saphir. New York: Hoeber, 1937. 342 pp. Price, $5.00.

BABY EPICURE. By Elena Gildersleeve. New York: Dutton, 1937. 141 pp. Price, $1.75.

GROUP LEADERSHIP, WITH MODERN RULES OF PROCEDURE. By Robert D. Leigh. New York: Norton, 1936. 295 pp. Price, $2.50.

BIRTH CONTROL FOR SAINTS AND SINNERS. By Teunis Oldenburger. Grand Rapids: Calvin Press, 1934. 330 pp. Price, $2.50.

CHILDREN HANDICAPPED BY CEREBRAL PALSY. Psychological Factors in Management. By Elizabeth Evans Lord. New York: Commonwealth Fund, 1937. 105 pp. Price, $1.25.

SAFE CHILDBIRTH: THE THREE ESSENTIALS. By Kathleen Olga Vaughan. Baltimore: Wood, 1937. 154 pp. Price, $3.00.

FEEDING OUR CHILDREN. By Frank Howard Richardson. New York: Crowell, 1937. 159 pp. Price, $1.00.

THE INTIMATE SIDE OF A WOMAN'S LIFE By Leona W. Chalmers. New York: Pioneer, 1937. 128 pp. Price, $1.50.

GIVE YOUR HAIR A CHANCE. By John W. King. Cambridge: Bradner, 1937. 71 pp. Price, $1.00.

GUIDING YOUR LIFE. By Josephine A. Jackson, M.D. New York: Appleton-Century, 1937. 352 pp. Price, $2.50.

A WOMAN SURGEON. By Rosalie Slaughter Morton. New York: Stokes, 1937. 399 pp. Price, $3.00.

ASSOCIATION NEWS

SIXTY-SIXTH ANNUAL MEETING
AMERICAN PUBLIC HEALTH ASSOCIATION

New York, N. Y.
October 5–8, 1937
HEADQUARTERS: HOTEL PENNSYLVANIA

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Herald K. Bailey, M.D., Salyersville, Ky., Health Officer, Magoffin County

William T. Booher, M.D., 1443 Pleasant Ave., Wellsburg, W. Va., Brooke County Health Officer

L. V. Burkett, M.D., Court House, Midland, Mich., Director, Midland County Health Dept.

Charles D. Cawood, M.D., C.P.H., 521 S. Mill St., Lexington, Ky., Fayette County Health Officer

Seldon W. Chambers, M.D., Monticello, Ark., Director of Public Health

Roland R. Cross, M.D., Dahlgren, Ill., District Health Superintendent, State Dept. of Public Health

Lee A. Dare, M.D., Lawrenceburg, Ky., Health Officer, Anderson County Health Dept.

J. Morrill Dishman, M.D., Caldwell County Health Dept., Princeton, Ky., Caldwell County Health Officer

Nicholas H. Ellis, M.D., Williamstown, Ky., Grant County Health Officer

Malcolm T. Foster, M.D., C.P.H., Box 470, Fayetteville, N. C., Cumberland County Health Officer

Luke W. Frame, M.D., Braxton County Public Health Service, Sutton, W. Va., District Health Officer

William D. Gill, M.D., 705 E. Houston St., San Antonio, Tex., Chairman, Board of Health

Herman C. Groman, M.D., City Hall, Hammond, Ind., Secretary, Board of Health

John F. Hackler, M.D., P. O. Box 471, Stillwater, Okla., Payne County Health Officer

James F. Harrell, M.D., Bardwell, Ky., Carlisle County Health Officer

James W. Hawkins, M.D., Twin Falls, Idaho, Director, Twin Falls County Health Unit

Sanford P. Lehman, M.D., Court House, Olympia, Wash., County Health Officer

Otis R. Lynch, M.D., Brandenburg, Ky., Director, Meade County Health Dept.

R. Heslop Payne, M.D., Tripp, S. D., Director, Hutchinson County Health Unit

E. T. Riley, M.D., Frenchburg, Ky., County Health Officer

Harry A. Shields, M.D., Warsaw, Ky., Gallatin County Health Officer

Joseph S. Spoto, M.D., C.P.H., 1301 Florida Ave., Tampa, Fla., Director, Hillsborough County Health Dept.

Lawrence H. Wagers, M.D., Manchester, Ky., Clay County Health Officer

Laboratory Section

Elizabeth J. Cope, 3333 Vicksburg Ave., Detroit, Mich., Bacteriologist, Detroit Dept. of Health

Philip R. Carlquist, Draper, Utah, Bacteriologist, State Board of Health, Division of Laboratories

Henry Mazer, 129 Chambers St., Boston, Mass., Assistant Chemist and Sanitary Biologist, City Health Dept.

Mary S. Walker, Box 826, Anniston, Ala., Director, Branch Laboratory
Alison Watt, Board of Health Laboratory, Honolulu, T. H., Bacteriologist

Vital Statistics Section

Victor Einach, 113 High St., Buffalo, N. Y., Junior Statistician, State Dept. of Health
Harold Holand, 1018 N. Jefferson, Milwaukee, Wis., Statistician, Wisconsin Anti-Tuberculosis Assn.
Francis D. Rhoads, 1410 Alaska Bldg., Seattle, Wash., Registrar of Vital Statistics, State Dept. of Health
Rena Rosenberg, Children's Bureau, Dept. of Labor, Washington, D. C., Assistant Economic Analyst

Public Health Engineering Section

Arthur J. Farrell, 816 Oregon Bldg., Portland, Ore., State Plumbing Inspector, State Board of Health
Roye W. Franks, 1512 S.E. 16th, Portland, Ore., Assistant State Sanitary Engineer, State Board of Health
Judson A. Harmon, 3093 Life Sciences Bldg., Berkeley, Calif., Junior Sanitary Engineer
Russell W. Hart, P. O. Box 77, Albany, Ga., District Engineer, State Board of Health
Hugh J. O'Connor, 1289 Shakespeare Ave., New York, N. Y., Inspector of Foods, New York City Dept. of Health
Reginald C. Price, Mauston, Wis., District Sanitary Engineer, State Board of Health
Joseph G. Schaeffer, Parliament Bldgs., Regina, Sask., Canada, Chief Sanitary Engineer, Division of Sanitation, Dept. of Public Health of Saskatchewan
Edmond A. Turner, Quitman, Ga., Sanitary Engineer, Brooke County Board of Health

Industrial Hygiene Section

Allan L. Coleman, 96 Roger St., Hartford, Conn., Assistant Industrial Hygienist, State Dept. of Health
William G. Frederick, Sc.D., 15844 Dexter Blvd., Detroit, Mich., Bureau of Industrial Hygiene, Detroit Dept. of Health

Food and Nutrition Section

Cecil G. Dunn, Ph.D., Mass. Institute of Technology, Cambridge, Mass., Instructor, Research Associate, Dept. of Biology and Public Health
Mary E. Garvey, 29 S. Prospect St., Amherst, Mass., Assistant Professor of Bacteriology, Massachusetts State College
Clare M. Hartnett, 1317 Alaska Bldg., Seattle, Wash., Consultant Nutritionist, State Dept. of Health
Samuel E. Levinson, 3105 Brighton 3rd, Brooklyn, N. Y., Inspector of Foods, New York City Dept. of Health
Victor E. Ottobre, 134–18 Cross Island Blvd., Laurelton, N. Y., Inspector of Foods, New York City Dept. of Health
Glenn G. Slocum, Food and Drug Administration, Dept. of Agriculture, Washington, D. C., Assistant Bacteriologist
Arthur Weber, 2–03–55 Ave., Long Island City, N. Y., Chemist, New York Refinery, National Sugar Refining Co.

Child Hygiene Section

Leona Baumgartner, M.D., Ph.D., 125 Worth St., New York, N. Y., Medical Instructor, Child and School Hygiene, New York City Dept. of Health
Margaret H. Jones, M.D., Capitol Bldg., Cheyenne, Wyo., Director, Maternal and Child Health and of Crippled Children's Division, State Dept. of Health
Kaen A. Noonan, D.M.D., 153 Brighton Ave., Allston, Mass., Operating Dentist, Boston Health Unit
Dorothy B. Nyswander, Ph.D., 5101–39 Ave., Long Island City, N. Y., Director, School Health Study, Committee on Neighborhood Health Development, New York City Dept. of Health

Public Health Education Section

Margaret H. Jeffreys, State Board of Health, Dover, Del., Director, Dental Hygiene
Alfred R. Masten, M.D., 424 State Office Bldg., Denver, Colo., Director, Division of Tuberculosis Control, State Board of Health
Isadore Schayer, M.D., University of South Carolina, Columbia, S. C., Head of Dept. of Hygiene and Public Health

Public Health Nursing Section

Mary E. Bell, 251–5th Ave. E., Twin Falls, Idaho, Staff Nurse, County Health Unit
Alyce E. Bloom, Court House, Corvallis, Ore., County Nurse
M. Olwen Davies, R.N., University of California, Berkeley, Calif., Instructor, Division of Nursing Education
Bruce Hellams, Box 272, Tifton, Ga., District Consultant Nurse, State Board of Health
Dorothy L. Ingraham, Carter County Health Dept., Elizabethton, Tenn., Staff Nurse
Elizabeth H. McGalliard, 251–5th Ave., East, Twin Falls, Idaho, County Health Nurse
Iome M. Rieman, R.N., Kendrick, Idaho, Public Health Nurse, State of Idaho

Cecilia E. Walsh, R.N., 136 Whitford Ave., Providence, R. I., Supervisor of Nurses, State Dept. of Public Health

Ruth A. Zarasky, 1625 E. Jefferson St., Springfield, Ill., Public Health Nurse

Epidemiology Section

John J. Bourke, M.D., State Office Bldg., Albany, N. Y., Epidemiologist-in-training, State Dept. of Health

Clarence F. W. Hames, M.D., D.P.H., Dept. of Public Health, Regina, Sask., Canada, Administrative Medical Officer

Charles G. Hutter, M.D., M.P.H., Madison Barracks, N. Y., Lt. Colonel, U. S. Army Medical Corps

Edward R. Krumbiegel, M.D., Rm. 60², City Hall, Milwaukee, Wis., Director, Bureau of Communicable Diseases, Dept. of Health

Unaffiliated

Frank G. Boudreau, M.D., 40 Wall St., New York, N. Y., Director, Milbank Memorial Fund

D. Anthony D'Esopo, M.D., 180 Fort Washington Ave., New York, N. Y.

Howard M. Engle, M.D., 450 Sutter St., San Francisco, Calif., Practising Physician

Robert S. Fussell, Jr., Box 397, Luray, Va., Student

Alan Gregg, M.D., 49 W. 49th St., New York, N. Y., Director, Medical Sciences, Rockefeller Foundation

Lewis W. Hall, 9 W. Washington St., Chicago, Ill., Assistant Director of Health and Safety, Boy Scouts of America

William E. Lawrence, 825 W. 187 St., New York, N. Y., Assistant National Director of Health and Safety, Boy Scouts of America

ARE YOU GOING TO ENGLAND THIS SUMMER?

THE Royal Sanitary Institute will hold its Health Congress in Birmingham, England, July 12 to 17, 1937, and has extended a cordial invitation to the American Public Health Association to appoint delegates.

The Executive Board at its meeting on December 18 authorized the Executive Secretary to appoint Fellows who might be in England during the Congress to represent the Association. The Executive Secretary will be very happy to have word from any Fellow who plans to be in England at that time.

PUBLICATIONS NEEDED

THERE is a scarcity of several numbers of the *Journal*—January, 1935; June, 1935; November, 1935; February, 1936; and July, 1936; also *Year Book* for 1934–1935.

If any members can spare copies of these publications, the Executive Office will greatly appreciate it if they will send them in to headquarters—50 West 50 Street, New York, N. Y.

NEWS FROM THE FIELD

TWENTY-FIFTH ANNIVERSARY OF N.O.P.H.N.

THE National Organization for Public Health Nursing celebrated the Twenty-fifth Anniversary of its foundation with a luncheon at the Hotel Roosevelt, New York, on March 18. There were more than five hundred nurses and friends present.

The meeting was presided over by Charles C. Burlingham. The two principal speakers were Livingston Farrand, M.D.,* President of Cornell University, and Elizabeth G. Fox, R.N.,* Executive Director of the Visiting Nurses Association of New Haven, Conn. An introduction was given by Amelia Grant, R.N.,* the President of the N.O.P.H.N.

It was an inspiring occasion and inaugurated the campaign for an endowment of $75,000 to carry on its important Silver Jubilee Program.

As George E. Vincent, former President of the Rockefeller Foundation, said:

"The National Organization for Public Health Nursing has finely earned the right to celebrate its twenty-fifth anniversary, and to make an appeal for an appropriate gift from the American people."

MAY DAY–CHILD HEALTH DAY, MAY 1

ON May Day—"National Child Health Day"—a program entitled "Health protection for every child" will be broadcast from coast to coast over the Columbia Broadcasting System from a luncheon in New York at 2:30 to 3:00 P.M., E.D.S.T.

As a measure of coöperation in the celebration of May Day, now under the auspices of the U. S. Children's Bureau, the Child Welfare League of America has arranged this broadcast luncheon in which are joining the national councils and associations for health, social work, safety, the churches, educational groups, civic and service groups, whose activities contribute toward protecting the children of America.

Simultaneously throughout the country will be held local demonstrations for children with the accent on health—luncheons, meetings, and even breakfast parties in the far-time zones—to receive the inspiration and enthusiasm of national leaders for children on the master program.

SAFETY QUARTERLY

THE *American Journal of Safety* is a new quarterly magazine, the official organ of the American Association for Motor Vehicle Safety. Its editors are Henry Howard Kafka, Dr. Harry B. Litchfield, and David Brumer.

The first issue will be released in May.

The magazine is committed to medical research and will make a study into the causes of motor vehicle death and injury and prescribe preventive measures as well as cures. It also aims to foster Federal legislation for the establishment of a central bureau of registration for the tabbing of all former mental and narcotic patients, for the checking by state motor vehicle agencies before the issuance of drivers' licenses.

Communications should be addressed to 601 Brightwater Court, Brooklyn, N. Y.

MATERNAL WELFARE

THE American Committee on Maternal Welfare, Inc., will have a luncheon meeting at the Hotel Dennis in Atlantic City, New Jersey, on June 9. Short addresses will be made by Dr. Malcolm T. MacEachern, Dr. H. G. Weiskotten † and Dr. Ray Lyman Wilbur. It is requested that tickets be purchased directly from the hotel, and well in advance, so that the service will be expedited.

GEHRMANN LECTURES

THE Gehrmann Lectures for 1936–1937, at the University of Illinois College of Medicine, were delivered by Dr. Thomas Parran,* Surgeon General, U. S. Public Health Service, and President of the American Public Health Association, in Chicago, on March 22, 23, and 24. Dr. Parran's subjects were "Health as a Factor in Social Security," "Industrial Hygiene," and "Syphilis."

TEST OF ACCIDENT FATALITY FORMS

FOLLOWING the wishes of the Accident Prevention Conference of The Department of Commerce, of the Advisory Committee to the Division of Vital Statistics, Bureau of the Census, and of the Vital Statistics Section of the American Public Health Association, the Federal Division of Vital Statistics will make a preliminary test of certain accident-reporting forms. These forms have been developed upon the basis of work done by Dr. Earl G. Brown * of the Kansas State Board of Health, and by the Illinois Division of Highways. After these forms have been subjected to an experimental field study, they will be proposed as standard forms for use in the states, in accordance with the suggestion of the Vital Statistics Section of the American Public Health Association.—*The Registrar,* Dept. of Commerce, Bureau of the Census, 2, 3 (Mar. 15), 1937.

CINCHONA

OF interest to physicians and the trade is the establishment of Cinchona Products Institute, Inc., at 270 Madison Avenue, New York. Its chief objects are to coöperate with anyone interested in the use and application of products derived from *Cinchona* bark, both quinine and the other alkaloids; and to foster both medical and industrial research on these products.

SOUTHERN CALIFORNIA ASSOCIATION OFFICERS

THE following new officers were elected by the Southern California Public Health Association at its recent Annual Meeting.

President, Kenneth H. Sutherland, M.D.,† Santa Ana

President-elect, G. E. McDonald, M.D.,* Long Beach

First Vice-President, George F. Cottle, M.D.,† San Pedro

Second Vice-President, R. C. Main, M.D.,* Santa Barbara

Secretary-Treasurer, R. L. Kaufman, M.D.,† Whittier

PERSONALS

KATHARINE FAVILLE, R.N.,† has been appointed Director of the Henry Street Visiting Nurse Service. Miss Faville, who is Associate Dean of the Frances Payne Bolton School of Nursing at Western Reserve University, will begin her new duties in the early autumn, succeeding Marguerite Wales, R.N.,* who resigned last summer to head the Nursing Education Department of the W. K. Kellogg Foundation. Elizabeth Mackenzie, R.N., who has been Acting Director since Miss Wales's resignation, will continue as Associate Director of Nurses.

DAISY M. O. ROBINSON, M.Sc., M.D.,* lecturer on the staff of the Division

* Fellow A.P.H.A.
† Member A.P.H.A.

of Social Hygiene of New York State since 1927, retired from state service on March 1.

JULIUS KATZ, M.D., has been appointed clinic physician in the Division of Tuberculosis of New York State, effective February 15.

DR. JOHN W. BROWN,* former Texas State Health Officer has become Director of Public Health in Houston, Tex.

WILLIAM E. WOODALL, Chief Disinfector of the Baltimore City Department of Health, recently resigned, after being associated with the Department 34 years.

DR. SUSIE HURST THOMPSON, formerly of Gary, Ind., has been appointed to take charge of District No. 2 of the Children's Fund of Michigan, including the counties of Ogemaw, Alcono, Iosco, and Oscoda, with headquarters in West Branch. She succeeds Dr. Gladys J. Kleinschmidt, of Ann Arbor, who resigned November 1. This work is conducted in cooperation with the Michigan State Department of Health.

DR. JACKSON L. SADLER was recently named as Assistant Director of Child and Maternal Health by the Colorado State Board of Health.

DR. JESSE B. HOPKINS, of Pound, Va., has been appointed to the staff of the Bureau of Communicable Diseases of the Virginia State Department of Health.

J. LELAND TANNER, M.D., M.P.H.,† of Henderson, Ky., was recently elected President of the Green River Valley Public Health Association.

DR. HERBERT H. HUNT, of Mayfield, Ky., has been appointed Health Officer of Graves County, succeeding Dr. John R. Pryor.

DR. ERNEST L. GATES, of Greenville, Ky., has recently been appointed a member of the Kentucky State Board of Health.

DR. VESTER M. RUTHERFORD, of Woodward, Okla., has been appointed Health Officer of Woodward County.

CHARLES HEARD FIELD,† of Albany, Ga., Sanitary Engineer and Director of Malaria Control for Dougherty County, Ga., has been appointed Sanitary Engineer in Charge of Malaria Control for Chatham County, with offices at Savannah, Ga., effective March 1.

HELMUTH H. SCHRENK,† of Pittsburgh, Pa., has been appointed Chief Chemist of the Health Division of the U. S. Bureau of Mines. He succeeds William P. Yant,† resigned, and will have his headquarters at the Pittsburgh Experiment Station.

R. HESLOP PAYNE, M.D.,† of Tripp, S. D., has been appointed Director of a new health unit established in Hutchinson County, with headquarters at Tripp.

GAIUS E. HARMON, M.D.,* recently of the Chicago Board of Health, became Epidemiologist for the Department of Health in the City of Detroit on March 1. In this capacity, he will have charge of the epidemiological and statistical work in connection with the new program in Detroit for tuberculosis control.

HUGH R. LEAVELL, M.D.,† Director of Health of Louisville, Ky., has assumed full-time responsibility for The Department of Public Health, and for the first time Louisville now has a full-time Health Officer. Civil Service provisions have been extended to include the Health Department and an emergency flood appropriation for the Health Department of $75,000 has become available.

HAROLD M. KELSO, M.D.,† has assumed his duties as Health Officer in the recently organized Pulaski County Health Department, Virginia.

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* Fellow A.P.H.A.
† Member A.P.H.A.

L. J. ROPER, M.D.,* formerly City Health Officer of Portsmouth, Va., was appointed recently to join the Virginia State Department of Health, Richmond, Va. He will coöperate with Dr. Otis L. Anderson in the development and supervision of the venereal disease program.

SAMUEL FRANT, M.D.,† Epidemiologist of the New York Department of Health, has been placed in charge of the Bureau of Preventable Diseases of New York City.

DR. R. CAMPBELL MANSON, formerly assistant to R. G. Beachley, M.D.,* in the Southwest Health District, has been appointed Acting Health Officer of the Isle of Wight-Nansemond-Suffolk Health District, Virginia.

DR. CLINTON C. FULLER, of Columbus, Kans., has been appointed Health Officer of Cherokee County.

ADOLPH WEINZIRL, M.D.,† Epidemiologist of the Health Department of Baltimore, Md., has been appointed Health Officer of Portland, Ore. He will succeed John G. Abele, M.D.,† who will become City Epidemiologist.

CHARLES HOWE ELLER, M.D., Dr.P.H.,† recently Health Officer of Charlottesville, Va., and Secretary of the Albemarle County Board of Health, has been appointed Director of the Bureau of Rural Health in the Virginia State Health Department. He succeeds Edwin L. McQuade, M.D., Dr.P.H.,* who resigned because of ill health.

HAROLD H. MITCHELL, M.D.,* formerly President of the New York State Association of School Physicians, has been appointed a District Health Officer in New York City.

WILLIAM F. WILD, M.D.,* of Suffolk, Va., Health Officer of Suffolk and the Counties of Nansemond and Isle of Wight, Va., has been appointed a District Health Officer in New York City.

KENNETH F. MAXCY, M.D., Dr.P.H.,* Professor and head of the Department of Preventive Medicine and Public Health of the University of Minnesota School of Medicine, Minneapolis, has been selected as one of the scientific directors of the International Health Division of the Rockefeller Foundation.

ALFRED R. MASTEN, M.D.,† of Denver, Colo., has been named Director of the Division of Tuberculosis Control created by the Colorado State Board of Health.

FRANKLIN M. FOOTE, M.D.,† of Elizabethton, Tenn., has been appointed Chief of the Division of Local Health Administration of the Connecticut State Department of Health. He succeeds Benjamin G. Horning, M.D.,* who was appointed Health Officer of Hartford.

MARTHA L. CLIFFORD, M.D.,† Assistant Director of the Bureau of Child Hygiene of the Connecticut State Department of Health, has been named Director; and Dr. Martha A. O'Malley, of Waukon, Ia., has joined the Bureau staff.

GEORGE W. COX, M.D.,† of Del Rio, Tex., has been named Health Officer of Texas, to succeed John William Brown, M.D.*

HENRY F. R. WATTS, M.D., of Dorchester, Mass., has been appointed Health Commissioner of Boston, succeeding the late Dr. William B. Keeler.†

DEATH

DR. LOUIS V. WALDRON,† Commissioner of Health, Yonkers, N. Y., died March 13 from pneumonia following an automobile accident. Dr. Waldron, who has served about one years, is the third Commissioner of Health of Yonkers to die in office within 2 years.

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* Fellow A.P.H.A.
† Member A.P.H.A.

CONFERENCES AND DATES

American Chemical Society. Chapel Hill, N. C. April 12–15.

American College of Physicians. St. Louis, Mo. April 19–23.

American Pediatric Society. University, Va. April 29–May 1.

American Physiological Society. Memphis, Tenn. April 21–24.

American Public Health Association—66th Annual Meeting. Hotel Pennsylvania, New York, N. Y. October 5–8.

American Society for Experimental Pathology. Memphis, Tenn. April 21–24.

American Society for Pharmacology and Experimental Therapeutics. Memphis, Tenn. April 21–24.

American Society of Biological Chemistry. Memphis, Tenn. April 21–24.

American Water Works Association—Four States Section (Eastern Pennsylvania, Maryland, Delaware, Washington, D. C.) Joint meeting with Pennsylvania Water Works Operators Association. Bellevue-Stratford Hotel, Philadelphia, Pa. April 22–23.

Arizona Public Health Association—joint meeting with New Mexico Public Health Association (during annual meeting of Western Branch, A.P.H.A.). Phoenix, Ariz. April 12.

California Tuberculosis Association. Riverside, Calif. April 5–6.

Children's Bureau, U. S. Department of Labor—25th Anniversary Dinner. Hotel Mayflower, Washington, D. C. April 8.

Conference of State and Provincial Health Authorities of North America. Washington, D. C. April 5–6.

Federation of American Societies for Experimental Biology. Memphis, Tenn. April 21–24.

May Day–Child Health Day 1937. Saturday, May 1.

Missouri Public Health Association. Springfield, Mo. April 29–30.

Mother's Day. May 9.

National Academy of Science. Washington, D. C. April 26–28.

National Organization for Public Health Nursing. Silver Jubilee Meeting—in conjunction with Annual Meeting of the American Public Health Association. Hotel Pennsylvania, New York, N. Y. October 4.

New Mexico Public Health Association—joint meeting with Arizona Public Health Association (during annual meeting of Western Branch, A.P.H.A.). Phoenix, Ariz. April 12.

Salmon Committee on Psychiatry and Mental Hygiene. Fifth Series of Thomas William Salmon Memorial Lectures, to be given by William Healy, M.D. New York Academy of Medicine. April 9, 16, 23.

Society of State Directors of Physical and Health Education. New York, N. Y. April 21–24.

State and Provincial Health Authorities of North America—Annual Meeting. Washington, D. C. April 7–8.

State and Territorial Health Officers Conference with the Surgeon General. Washington, D. C. April 7–8.

Western Branch, American Public Health Association—Eighth Annual Meeting. Phoenix, Ariz. April 13–15.

FOREIGN

Hawaii Territorial Medical Association. Hilo, T. H. April 30–May 2.

Empire Conference on the Care and After-Care of the Tuberculous. Over-Seas House, St. James's, London. May 3–8.

Tuberculosis Association. Manchester, England. June 10–12.

National Association for the Prevention of Tuberculosis. Bristol, England. July 1–3.

Fifth International Congress of Hospitals. Paris, France. July 5–11.